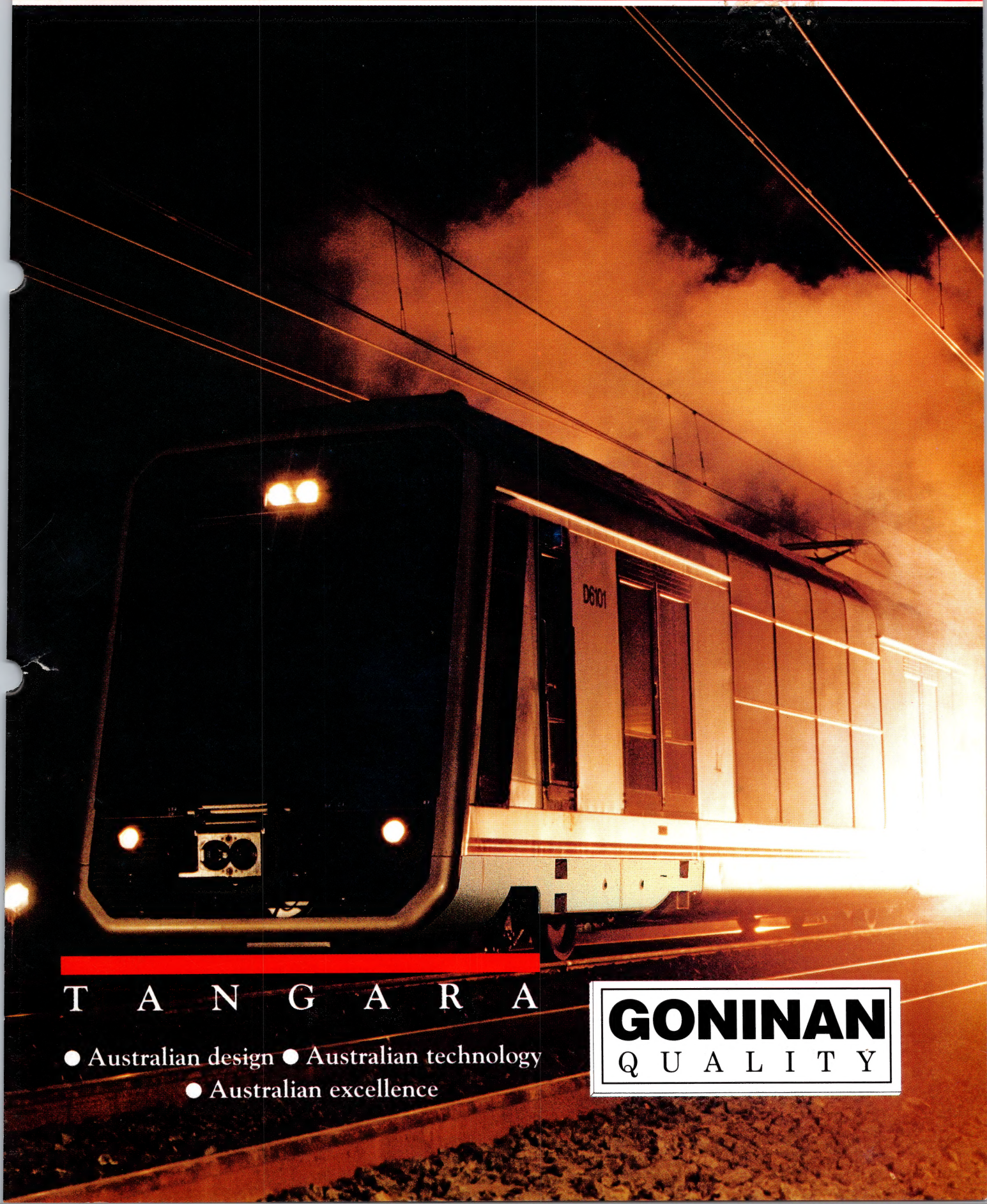
NETWORK

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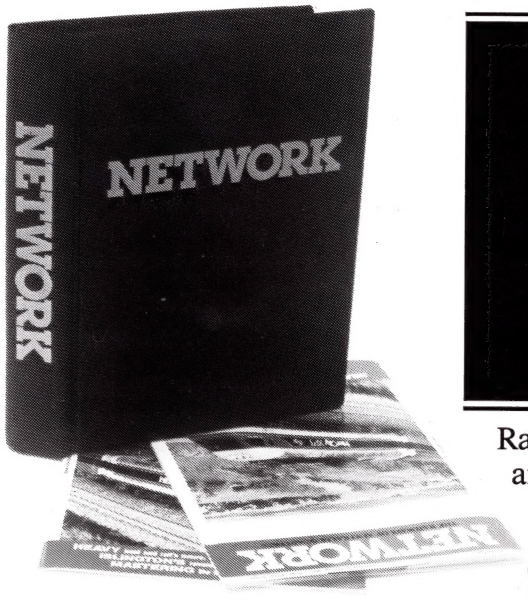


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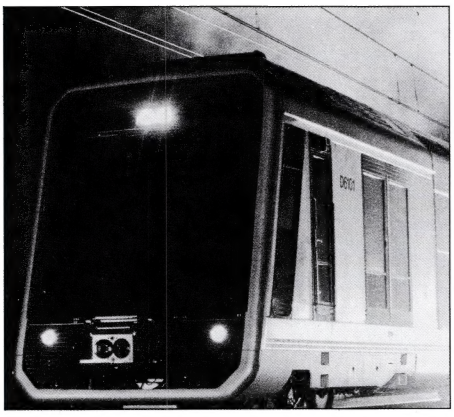
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NETWORK

THE RAILWAYS OF AUSTRALIA QUARTERLY

Volume 28, Number 3
July, August, September 1991



COVER: Sydney's new generation commuter train, Tangara, developed by A Goninan & Co Limited. When the State Rail Authority of NSW addressed the need to update Sydney's rail travel into the 21st century, the challenge fell to Goninan to co-ordinate all aspects of the Tangara project as prime mover for the largest railway contract ever awarded in Australia. Goninan integrated the world's most advanced systems into a passenger train that is efficient, reliable and cost effective to operate. Other State governments are now investigating the use of Goninan's capabilities to produce their particular needs. . . an example of Australian technology and excellence at work.

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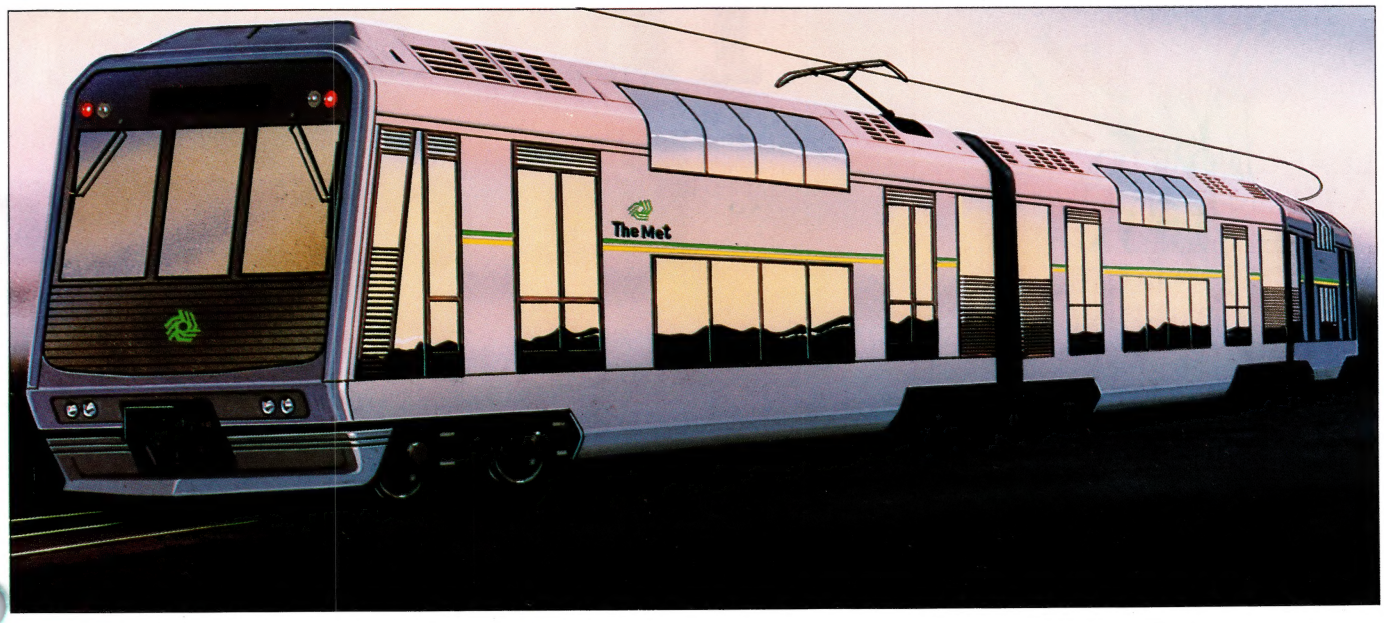
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Melbourne's double-decker

Melbourne can expect to see its first state-of-the-art double-decker train early next year. The $14.4 million construction project, is jointly funded by State and Federal Governments. The double-decker initially will be used on the Lilydale line which carries 92,000 people each day.

Frequency of services during peak hours on this line is at an optimum, and using current rolling stock, no additional services can be added to existing timetable. The double-decker, using latest technology, will allow the Public Transport Corporation to move thousands of passengers each day without requiring more services.

NETWORK

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- *Public Transport Corporation – Victoria (V/Line & THE MET)*
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The great in driver

LEARNING TO DRIVE A TRAIN IS NOT WHAT IT USED TO BE. THE RADICAL CHANGE NOW OCCURRING IN DRIVER TRAINING METHODS AND TECHNIQUES IS THRUSTING AUSTRALIA INTO THE FOREFRONT OF INTERNATIONAL EXPERTISE. COMPUTERS AND SIMULATORS ARE IMPORTANT TOOLS IN THE NEW INTEGRATED APPROACH TO TRAINING WITH THE STATE OF VICTORIA LEADING THE WAY.

Melbourne's double-decker ►

Initially a four-carriage set will be trialled for 12 months to gauge customer reaction, and to give the PTC a chance to assess how the double-deckers function from an operating and maintenance perspective. The carriages are being built by A. Goninan and Co. Ltd. at the Broadmeadows plant, near Newcastle, NSW. The train, while similar to New South Wales' "Tangara" trains, will be designed to suit Victorian conditions. Features will include airconditioning and a wide fully-enclosed gangway which will provide safe access between carriages. The new double-decker will also feature wrap-around windows, aircraft-type seating and an emergency communication system which can immediately link passengers with train staff.

With trains of the future becoming bigger, longer, heavier and faster the introduction of sophisticated technology into driver training in Victoria is leading the way in efficient operational techniques which will improve safety and performance and increase the productive working life of drivers.

The Victorian Public Transport Corporation's Driver Training Project implemented at the new Dynon Training Centre, Melbourne, has adopted a very methodical and integrated approach to training which emphasises the study of interaction between the driver and the behaviour of his train.

The concept involves building a profile of driver-train behaviour for all major lines, different types of trains, and under different weather conditions so that a computer picture is gradually evolved in the preparation of operational performance standards.

One of the first tasks is to determine what action drivers are taking now – just how do they drive their trains? At what point are the brakes applied, for example, when the front half of a train is on a downhill grade and the rear section is still negotiating the uphill side of a hump?

To assist in gathering this type of detailed information data loggers, equivalent to the renowned black box flight recorders on aircraft, are being installed in all modern VPTC Locomotives. One hundred and nine data loggers are on order from Gemco Limited.

This detailed task analysis approach and the project itself, radical developments in training, are being undertaken in co-operation and with assistance from drivers and officers of the Australian Federated Union of Locomotive Enginemen (AFULE) which is fundamental to this whole new approach to operational training. Task analysis will show over a period of time what drivers do, how they do it, why they do it, and more significantly the effect of their actions on actual train performance.

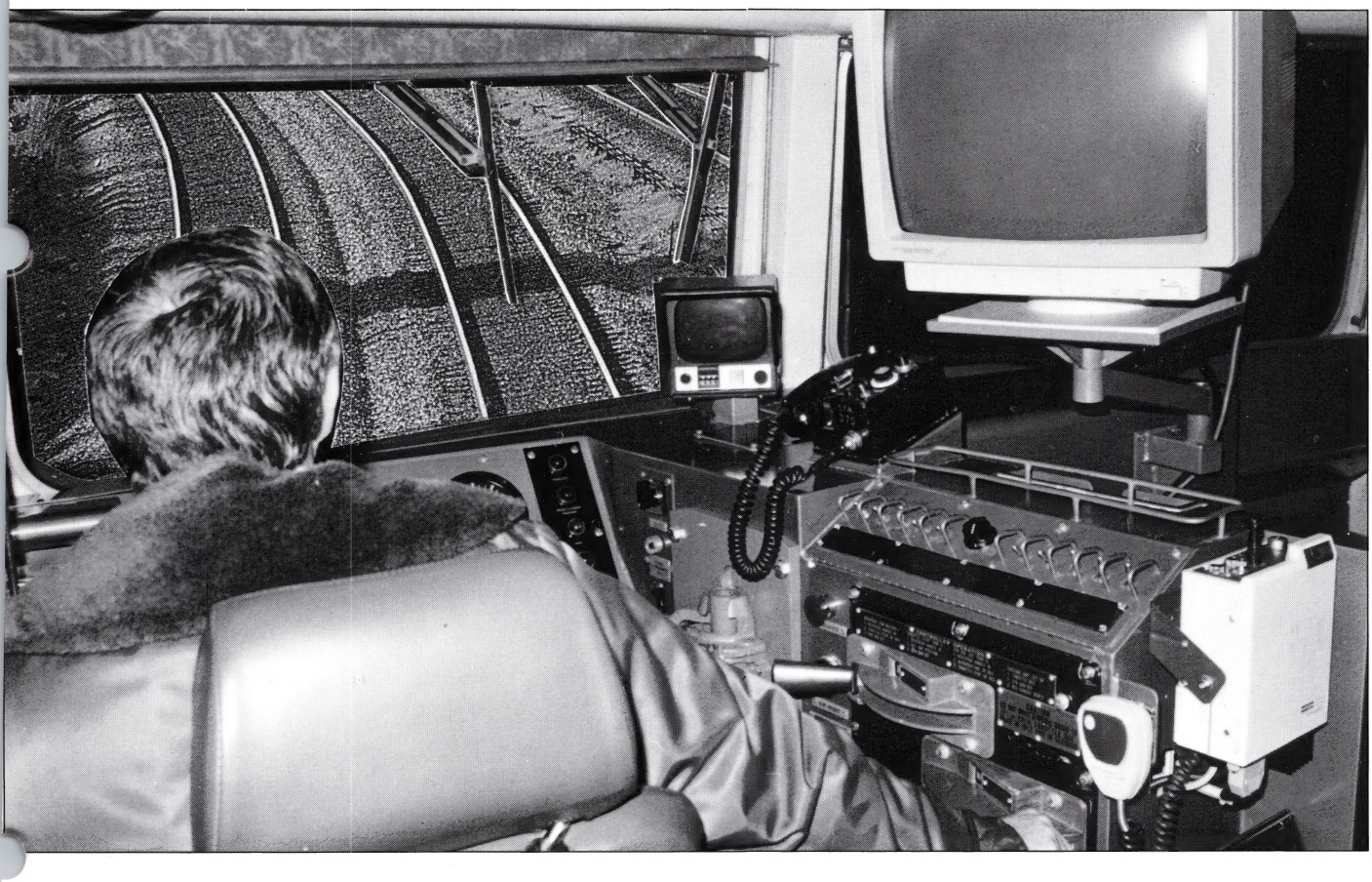
This insight into the decision-making processes of train driving will reflect real-life experiences. Few job performance studies of such an intimate nature have been undertaken previously in rail transport anywhere in the world.

Initial driver task analysis using actual observation methods, less sophisticated than the computerised data logger, already has set the baseline strategies for the revision and restructuring of driver training courses. Learning the application of braking strategies, for instance, has been given considerably greater importance than previously in the new syllabus.

The training concept was developed by Mr Frank Wagner, former group manager, Project Resources Division, VPTC, and now group manager training projects in New South Wales, State Rail Authority. The project was actioned under Mr C.J. Oates, now VPTC Training Manager, formerly from the Royal Australian Air Force Hornet Project.

Old-style training involved learning about the mechanical structure and physical operation of the brakes and how they slowed the train over its whole length. When to apply braking then was a matter for driver judgement acquired with experience which was often unsupervised, and subject to inconsistencies and sometimes regrettable error.

leap forward training



The simulator trainer is built around a real G Class locomotive cabin. For the driver things can be made to happen unexpectedly.

On-board monitoring

Now, the concept involves on-board monitoring of the effect of varying degrees of brake application on the operation of the train. Slow, gradual braking downhill to control speed from the outset of the decline in terrain imposes less stress on materials than a gravitationally-assisted run-up of speed which has to be arrested when it is judged to be excessive.

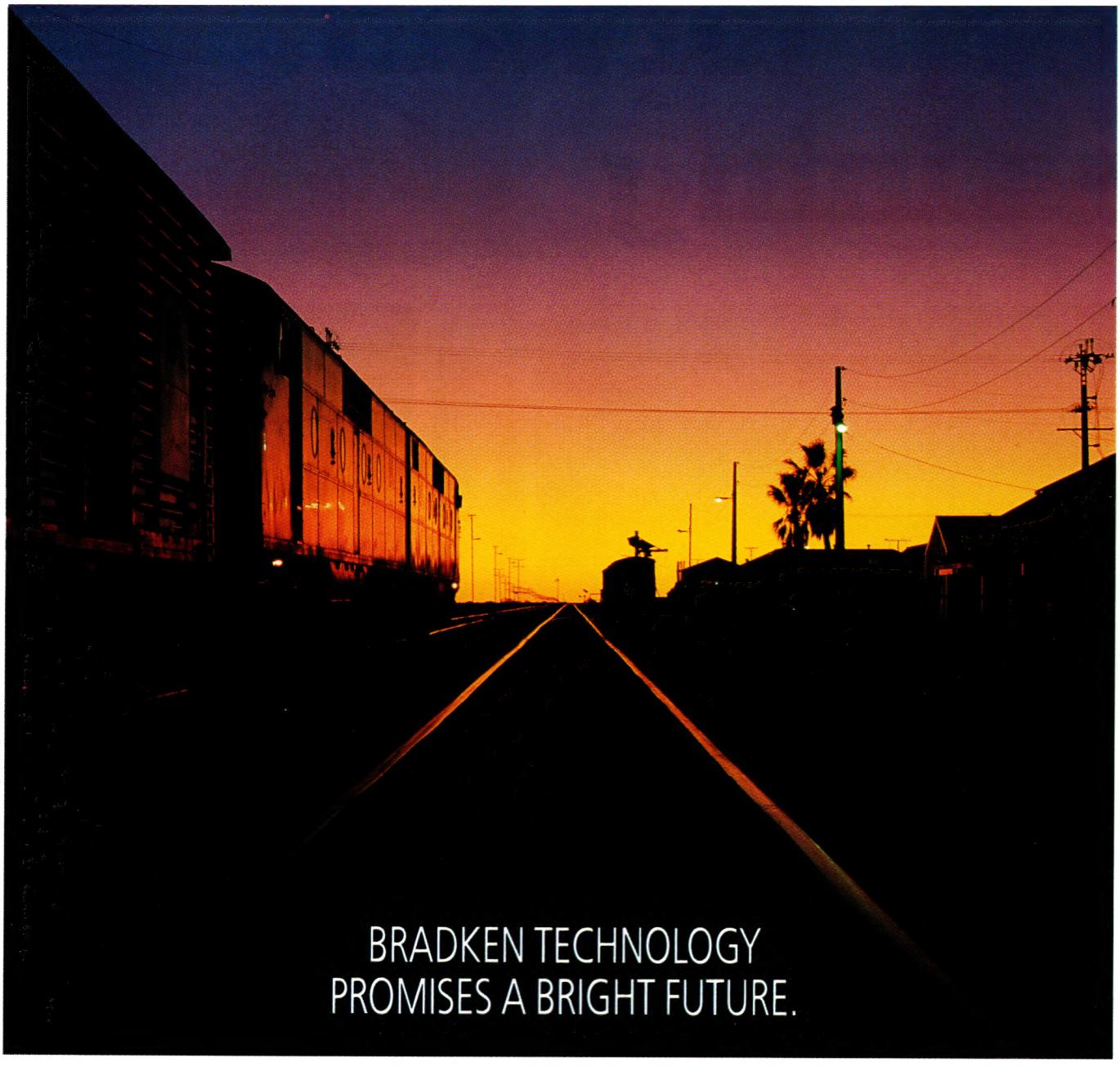
Such fine differences in braking techniques at first appear inconsequential, but consider the multiplication effect many times over, during even one year, of the impact on wear and tear of track and rolling stock and the cost savings alone are enormous without optimum strategies.

It is these cost-effective principles of train operation which are of concern to Alan Whitla, development and implementation manager, and Michael Clark, project officer, and the other staff involved in implementation of the new training scheme.

They are developing a system for enabling trainee drivers to obtain knowledge, information and actual driving experience through this skills acceleration program thus qualifying drivers in much less time. At the same time the selection criteria for course entry has been revised to help reduce the drop-out rate, and to link with revised career path progression.

One of the results of driver task analysis is that the new driver training course can be completed in two years for V/Line train drivers. This is a two-thirds reduction on the minimum six years it took to fully qualify in the old course, and ensures that trainees are put to productive use much sooner.

A similar new driver training course for The Met, the Melbourne



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suburban rail system, has been evolved in parallel with the V/Line course. It previously took a minimum of six years to fully qualify suburban electric train drivers. The first graduates from the new Met course are expected about mid 1992.

On-the-job training, which is under the control of the Victorian PTC's Driver Training Centre forms a major component of the integrated approach to training and ensures that trainees are fully productive for 80 per cent of their training time.

On-the-job training instructors who instruct trainees while in charge of the normal revenue-producing trains, receive briefing, monitoring and debriefing procedural instruction themselves. This takes place during normal working conditions. Judgemental criteria when assessing trainees is very specific to eliminate, as far as possible, subjective judgements. There is no ivory tower philosophy about driver training. The classroom instructors are all practical people seconded from the ranks of qualified and experienced drivers rotated through the Driver Training Centre every two or three years, and who regularly return to driver duties while instructing to maintain their own creditability and proficiency.

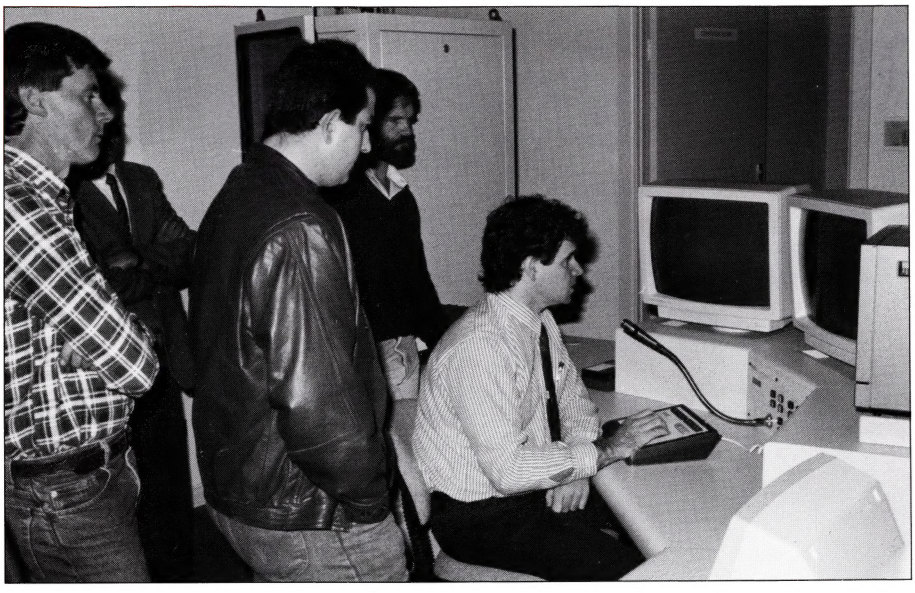
Once the Instructor Driver Special Class (IDSC) has endorsed a trainee's proficiency the trainee proceeds under the supervision of a qualified driver.

The computer-based training (ICL Limited were the successful tenderers to the project software specification) occupies much of the current indoor work at the Driver Training Centre with the development and upgrading of customised software which allows individual trainees to proceed at their own pace. The computer component of the integrated training program has great potential for distance learning locations such as country centres which in the past have sent trainees to Melbourne.

To other railroads

Expansion to other State systems and international railroads is a cost-efficient next step.

In future, country centres will be able to undertake basic training to specified performance levels. Computer disk distribution also will assist the implementation of training in response to needs extrapolated from the voluminous range of documentation which comes in regularly from many sources.



Adam Anderson, at the computer controls, a mechanical engineer with the VPTC, is the project engineer for driver training. As trainees look on he programs the simulator to provide in-depth driving experience.

The computer training phase is based on mastery of the knowledge requirements necessary to do the task. One of the strong points flowing from it is the contribution it is making to safer train operational standards at the human level. There are currently about 98 trainees who have commenced the new Driver Training Course.

For the visitor to the Driver Training Centre at Dynon the most spectacular feature of the VPTC training operation is the newly-installed V/Line locomotive simulator. The centre has made provision for three simulators – two for V/Line and one for The Met which will be operating by the end of this year. The project team already has developed the requirements for a fourth, a double decker train simulator, similar to the Tangara train. The simulator contract originally was won by ACET Limited which successfully tendered to the project specification, and which since has been absorbed by Gemco Limited.

The simulator consists of a real G-Class locomotive cabin, back-projector screen, and the latest computerised technology to duplicate problems in the operation of trains of different configurations over the varying terrain and traffic conditions of the State of Victoria. The simulator driving experience is very realistic with the view through the front window of the cabin filmed along actual track for various main routes. VPTC has its own video-filming capability to continue the development of simulator scenarios.

Versatility of the simulator

The simulator will be able to replicate a train and experiment with different driving techniques along a given track, or a specially-designed test track, when it is fully operational. Actual train journeys can be replicated now, and even drivers of 15 years' experience or more may find that doing things slightly differently can save fuel and wear on brake blocks. The simulator will be able to enhance driving skills, and accelerate the learning of basic skills for new drivers.

The unique feature of the simulator will be its ability to replay the actual loco logger recorder and compare the driver's actual driving against the optimum driver strategies developed by Special Class Instructor Drivers. This provides for actual driver behaviour to be compared objectively with optimum performance standards.

This overall integrated approach to driver training in Victoria is attracting considerable interest from within Australia and internationally. □

Filming 400km of track in Queensland



A typical TS-2 interior of the type being installed at Rockhampton Training Centre, Queensland.

While Victoria's PTC is introducing a flexible computer-based integrated simulator system, Queensland Railways also is modernising its driver training approach with the help of simulators. Filming 400 km of track is envisaged in the north of the continent.

The Queensland simulators are to be supplied by EB Signals Pty Ltd, part of the ABB Asea Brown Boveri Transportation Group.

They will interface with Queensland Rail locomotive control and provide interactive video and audio simulation to give a high level of realism.

The contract is for two TS-2 simulators that will use the latest recordable laser video disc and projector technology with mini computer control. They are being installed at Rockhampton Training Centre.

The contract includes filming 400km of Queensland Railways track, which will be used to train drivers for many variations of terrain and conditions.

Locomotive simulators provide an economical means of training drivers under controlled conditions, where a wide variety of events, including simulated faults, can be imposed. This results in greatly improved driver training, with less real locomotive training time required.

The simulator supplier, EB Signals Pty Ltd, recently entered into a technology transfer and exclusive marketing agreement with ITT Research Institute, Chicago, for the supply of locomotive simulators to the Australian and New Zealand markets.

EB Signals entry to the locomotive simulator market segment complements current activities for the supply of railway signalling and automatic train protection (ATP) equipment and adds to the overall capabilities of the ABB Transportation Segment in Australia.

The Public Transport Corporation of Victoria awarded a contract to ICL Australia to provide a flexible computer-based training system, which is forming a critical component of its new driver training course.

The system helps to train and monitor the progress of diesel locomotive and electric train drivers over a two-year course, at the corporation's South Dynon Driver Training Centre, near Melbourne.

Selected from the TenCore family of authoring products, the system is

being integrated into the corporation's new driver training program, to provide a compreshensive and fully integrated training system incorporating on the job training, simulator training and computer-aided instruction, managed through a CMI sub-system.

The system adapts to varying levels of student driver experience and ability, offering self-paced delivery and the monitoring progress.

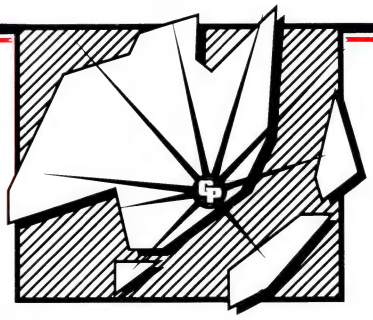
The TenCore package comprises product language authoring and computer manager instruction systems, as well as a customised relational database developed by ICL to meet PTC specifications for the management and administration of courseware and trainees. The package allows the PTC to rapidly develop and administer its own courseware over a PC network, following integration and training by ICL Australia.

The system's graphic functions, run-time speed, and flexible interactive video control, allow authors to create simulations to be incorporated within courses. It was chosen because of its ability to adapt into both an organised training timetable, and to be used for one-off training sessions.

Throughout the course, learning tasks automatically are assigned to students, and progress can be reviewed by students, instructors and administrators at any time. The authoring system creates attractive, "friendly" lessons. This is an important aspect of the system, since many of the trainees have never previously sat in front of a computer terminal.

The PTC is able to build on this system in line with its needs, and eventually more than 230 hours of courseware will be developed for its locomotive and electric train driver education. Computer-based training manager for ICL Australia, Mr Ian Hough, said that he hoped the project, would be the first of many with the Public Transport Corporation.

ICL Australia Pty Ltd, specialises in providing integrated solutions to meet the information technology needs of Australia's local, State and Federal governments and defence, retail and financial and commercial markets. Its annual sales are nearly $170 million. □



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The green of

Australia's first environmental exposition on rail, the ABC Green Train in Queensland attracted approximately 236,000 visitors on a recent three-week run along the coast between Brisbane and Cairns, a distance of 1,681 kilometres.

The 15-carriage train, an initiative of the Australia Broadcasting Corporation in Queensland, was jointly sponsored by Queensland Rail.

The ABC Train comprised a diesel engine, 15 display QLX carriages, club car for entertaining exhibitors' clients, dining car for staff and power carriage and luggage van.

A striking 200-metre flora and fauna mural was painted on the outside of the exhibitors' cars.

The theme of the train was *Finding Common Ground.*

Twenty five exhibitors, representing industry conservation groups and government departments took part. They included Mount Isa Mines, Greening Australia, the Australian Conservation Foundation, Telecom Australia, the ABC, and Queensland Rail.

There was strong early support from exhibitors when the project was launched.

Public response at Cairns for the opening two days, 2-3 June confirmed the wisdom of exhibitors to participate. An estimated 30,000 people, about half of Cairns' population, visited the train.

Queensland Rail's Chief Executive, Vince O'Rourke said the ABC Green Train undoubtedly had been one of QR's most successful promotions.

"We are thrilled with the success of the train and welcomed the opportunity to team with the ABC to provide such a popular exposition along the route," he said.

ABC's Radio Queensland Manager, Andrew Buchanan said he had been 'overwhelmed' by the popularity of the train. He said the Green Train was conceived at a staff luncheon where discussion centred on a suitable community project.



The 15-carriage Australian Broadcasting Corporation Green Train at Cairns in the far north of its 1,681 km run attracted crowds daily.

An interesting development in environmental education is the Green Train which the State Rail Authority in New South Wales is sending across 10,000 kilometres to 33 country towns until the end of August in a project designed to help school children learn more about environmental issues.

The five-car train was launched with ceremony earlier this year.

The green carriages feature displays of environmental issues of the day, including the "greenhouse effect", land degradation, water and air pollution, salination of vital waterways, energy conservation, and the environmental advantages of rail transport.

The Green Train is evidence of increasing focus on environmental issues throughout all aspects of the State Rail Authority's operations and activities. Many advances have been made by State Rail in environmental protection. Some achievements during the past few years include:

☐ The erection of acoustic fences between residential properties and the railway line after it

green trains Australia



was found that the Dombarton to Unaderra duplication led to an increase in noise levels experienced by surrounding residents.

☐ The installation of Cologne Eggs and Slyomer rubber pads at Circular Quay and Artarmon respectively. These components have successfully reduced the degree of noise and vibration that is transmitted to adjacent properties.

☐ Environmental management of large scale construction and maintenance programs.

Environmental monitoring has ensured that State Rail impact on the environment has been kept to a minimum. Residents have been informed, erosion and sediment controls have been installed and maintained and worksites have been revegetated.

Pollution control equipment at depots and workshops is constantly being upgraded in an effort to ensure that any liquids leaving the site, via stormwater or sewer, are as free from oil and other contaminants as possible.

The State Rail Authority has a number of sites where new technology is being applied in the form of "bio-bugs". These are genetically engineered bacteria which consume hydrocarbons.

One of the sites, as Werris Creek, has been transformed to become environmentally acceptable within nine months due to the introduction of "bio-bugs" to the soil.

Since August 1989 the State Rail Authority, along with other NSW government bodies, has been officially on the same playing field as private companies, with respect to exposure to prosecution under this State's many environmental laws.

It is now acceptable for one government department to prosecute another.

In November 1989 the State Government passed the *Environmental Offences and Penalties Act.*

This Act allows prosecution of companies and individual staff for wilful or negligent environmental damage. An individual could face a fine of up to $250,000 and/or up to seven years imprisonment. The individual could be a plant operator, a district engineer or even an executive officer – no one is exempt.

The company could also be fined up to $100,000. The major impact of this Act is the personal liability, and the fact that the individual is accountable for environmental damage under criminal law.

State Rail is currently assessing its exposure to fines and prosecutions under the *Environmental Offences and Penalties Act.* It is doing this by examining the environmental profile of all depots, workshops, property leases and operations. This examination is in the form of a written report called an environmental audit.

The audit looks at the following areas:

☐ Areas of non-compliance with existing environmental Acts.

☐ Areas of medium to high environmental risk.

☐ What procedures and equipment are on site to handle environmental accidents.

☐ Is there defined accountability within management for environmental matters on the site.



A 200-metre floral and fauna mural adorned the outside of Queensland's Green Train and helped to attract 200,000 visitors in three weeks.

- What specific environmental training is required for the staff on site.

These audits, environmental awareness training and the desire to become a better neighbour will see the State Rail Authority's environmental consciousness grow.

Staff training program

An environmental program is being established within the State Rail Authority. The aim of this program is to raise the level of environmental awareness of staff. The aim of training is to remove the likelihood of negligent or wilful damage being caused by an individual railway staff member.

The training will educate all staff to perform their tasks, including the management of contractors, in an environmentally sensitive manner. It will identify weaknesses in procedures, priorities capital works and maintenance programs, optimise environmental protection; and identify and rectify other environmental hazards within the SRA.

The training incorporates the ideas of due diligence as mentioned in the *Environmental Offences and Penalties Act.* A key component of this is developing and maintaining a high environmental awareness among all staff and managers.

This means that it is essential that all staff and managers receive environmental education. Without training a staff member could claim that his/her actions were not negligent or wilful and that the State Rail Authority contributed to the offence by not explaining the correct way of doing something.

All staff are being appropriately trained in their responsibilities to take the necessary preventative and remedial action regarding activities with the potential to cause environmental damage.

Six training packages are being developed. Each will include a video and a manual.

■ ***Package 1 — Design, Planning, Project Management and Management***

This package will be presented to the design, planning, project management and management personnel concentrating on issues such as the role of environmental planning in an overall project plan, the cost of implementing environmental planning and protection techniques versus a breach of the legislation environmental risks responsibility and liability, and identification and protection of heritage items.

■ ***Package 2 — Depots and Workshops***

This package is to be presented to all staff working in and associated with SRA workshops and depots. The package will focus on environmental risks, penalities, individual responsibility, being a better neighbour, identification and removal of bad practices, planning for an environmental emergency use and storage of hazardous goods.

■ ***Package 3 — Construction and Maintenance***

This package will be presented to all personnel working with the construction and maintenance fields of the SRA. The package will concentrate on environmental risks, identifying and removing bad practices, environmental steps to take during a construction or maintenance program, individual responsibility and liability and specific environmental protection techniques.

FOR MANY AUSTRALIANS THE ENVIRONMENT IS SEEN AS FUNDAMENTAL TO THE WELL-BEING AND ENJOYMENT OF FUTURE GENERATIONS, AND THEREFORE, SOMETHING OF VALUE WORTH FIGHTING FOR AT ALL LEVELS OF THE SOCIAL, ECONOMIC AND POLITICAL STRUCTURE OF SOCIETY.
AUSTRALIANS ARE ONLY JUST BEGINNING TO REALISE THE TREMENDOUS CONTRIBUTION OF RAIL TO ENVIRONMENTAL PROTECTION. RAIL CAN MOVE LARGE NUMBERS OF PEOPLE AND HUGE QUANTITIES OF GOODS QUICKLY AND EFFICIENTLY WITH MINIMAL IMPACT ON THE DELICATELY-BALANCED NATURAL ENVIRONMENT OF AUSTRALIA.

■ *Package 4 — Station Staff*

The package will be presented to both Freight and CityRail staff associated with railway stations and their associated buildings and storage facilities. It will concentrate on general environmental awareness, environmental responsibilities, waste disposal and waste minimisation, storage of chemicals, and being a better neighbour.

■ *Package 5 — Quarry Personnel*

This package will be presented to all staff associated with the operation of the SRA's quarries and will concentrate on noise control, dust control, erosion control, environmental responsibility and liability, site rehabilitation, and being a better neighbour.

■ *Package 6 — General Environmental Awareness*

The package will be viewed by all staff members of the State Rail Authority and briefly cover all aspects of environmental issues and laws which affect SRA activities. The video will contain examples of both good and bad practices.

The aim of environmental training is to educate all SRA personnel to perform their tasks in an environmentally responsible manner and, therefore, to protect them from prosecution under the numerous environmental Acts.

The training packages are being developed by Lyndall Dalley, a qualified environmental scientist. Her background includes environmental management work for the Roads and Traffic Authority, the Water Board, the Electricity Commission and the State Rail Authority. Her railway experience is multi-faceted.

Initially she was employed as an assistant to the environmental engineer to follow up environmental problems associated with State Rail's operations and activities. She has since worked as an environmental manager on three closedown projects; the Illawarra Christmas closedown, the Valley heights to Lindon closedown and the St Marys to Glenbrook closedown.

This involved working directly with track staff, liaising with local residents and monitoring the day-to-day activities. Lyndall has also been involved in the organisation and presentation of environmental awareness seminars and workshops for some of the Authority's construction and maintenance staff. □

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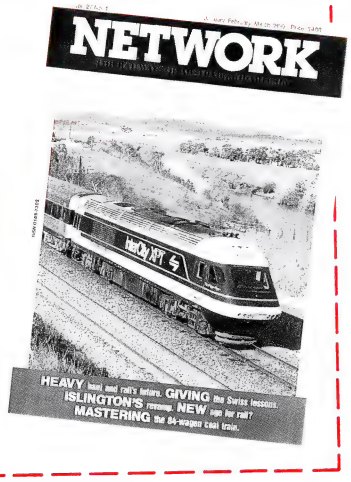
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A RoadRailer train clearly showing the alternating sets of on-rail/on-road wheels which give the new vehicle its versatility for door to door delivery. The RoadRailer is set to change freight transport in Australia.

A HIGHLIGHT AT AUSTRALIA'S FIRST NATIONAL FREIGHT CONGRESS

The RoadRailer Rules

One of the highlights of Australia's first national freight congress and exhibition held from 31 July to 2 August at the World Congress Centre, Melbourne, is the RoadRailer, a semi-trailer road vehicle which quickly and easily converts to rail track operation.

Australian National has exclusive rights to make, market and operate the RoadRailer in Australia.

Loaded at the customer's factory or forwarding depot, the customer or contractor's own prime mover hauls the trailer to a RoadRailer depot. Two men, one of them the truck driver, convert the vehicle to rail track operation in less then five minutes.

The air-bag suspension of the RoadRailer itself raises the trailer body. The road wheels slide forward. The rail bogie is wheeled into place and the trailer's suspension is lowered. The road wheels always remain clear of the rails.

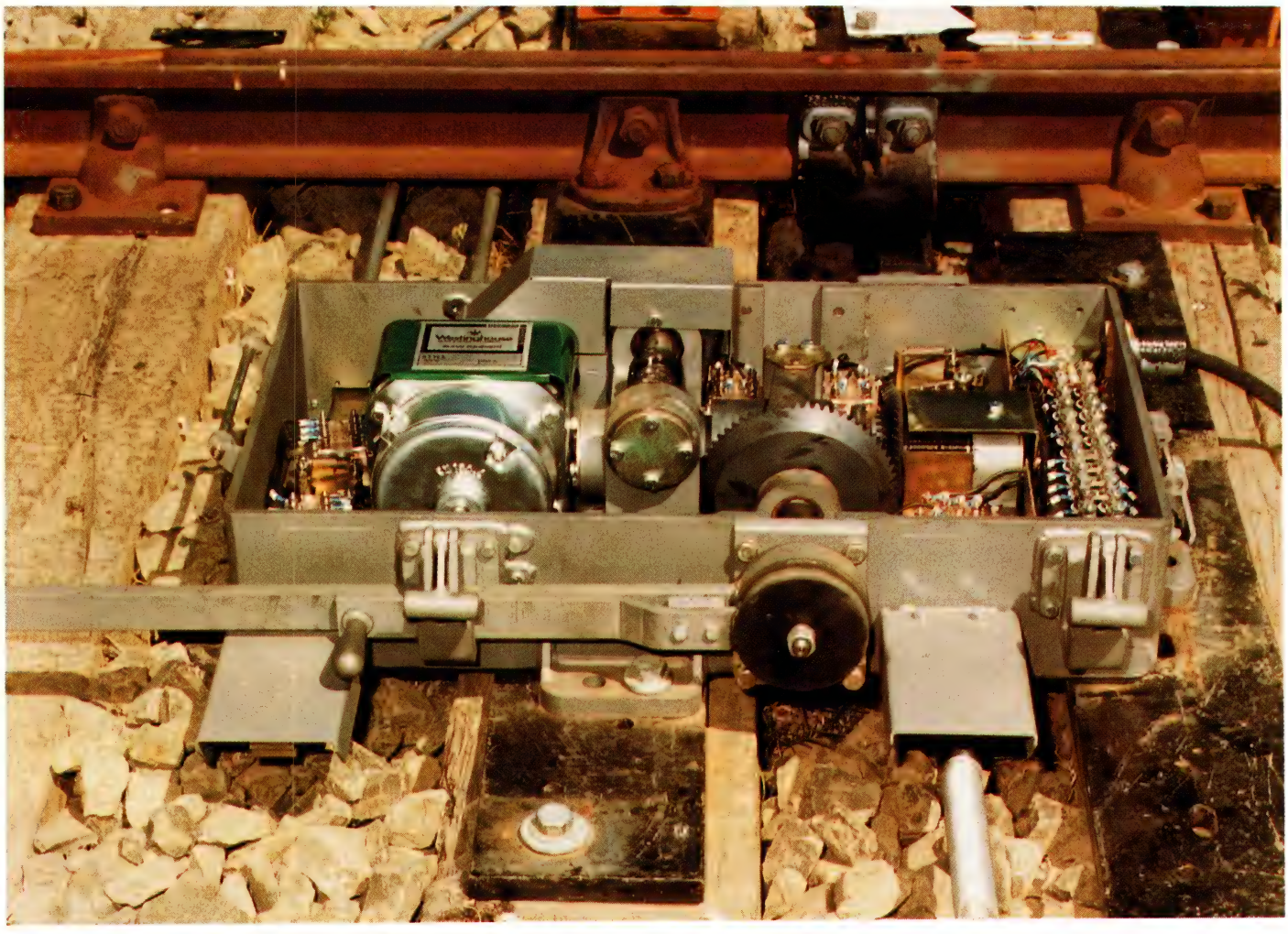
That is how the RoadRailer system operates. Wherever it has been shown and operated it has attracted widespread interest. Australian freight forwarders are just beginning to realise its tremendous potential.

More than 140 leading authorities on specific transport and freight topics are listed to speak at stream sessions forming part of the Freight Congress 91 program. About 150 companies and organisations are exhibiting products and services. The organisers plan to hold the event every two years.

Among the speakers is Mr Ted Butcher from the National Rail Freight Corporation; he is scheduled to outline this new concept for Australia in rail freight operations. His address will cover the development and future role of rail, marketing and operational priorities of the new corporation, strategies for increasing the market share, the terminal interface.

Other topics Mr Butcher will touch on include: new opportunites in rail for the private freight-forwarding industry, the integration of the State

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A GREAT COMPANY IN GREAT COMPANY

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rail networks, the corporation and the Very Fast Train concept, and rail's potential in the decade ahead.

Queensland promotion

Meanwhile the RoadRailer has been drawing much attention from the media, freight forwarders and company representatives in Queensland where, as part of a national promotion drive, it has been demonstrated at field days in Brisbane, Rockhampton and Townsville.

The result of an initiative taken by Queensland Railways, the displays were staged jointly by Queensland Railways and Australian National, attracting crowds for the three events totalling about 300 potential customers, and onlookers. Two flattop and one pantechnicon RoadRailer were featured, supported by a three-man AN promotions team and RoadRailer sales manager, Esmond Fernand.

The Brisbane field day was held at QR's Clapham rail yard and was attended by the Queensland Transport Minister, Mr David Hamill and AN Freight's general manager, Brian Conroy.

RoadRailer sales manager, Esmond Fernand, said the level of interest throughout the field days in Queensland was very encouraging. "We had a number of specific enquiries from customers which are now being progressed, including the use of the RoadRailer in general freight operations between Townsville and Mt Isa."

Australian National currently has six RoadRailers available and another 10 are under construction. These 16 RoadRailers will offer a variety of prototype configurations including curtain siders, refrigerated vans, dry pans, flat beds, tankers, skeletals and tippers.

The new RoadRailer prototypes now coming on stream, and all future units, have a new suspension which provides a higher clearance from rail to wheel.

The RoadRailers sent to the Queensland field days were modified to fit narrow-gauge bogies and underwent operational trials on the run to Townsville and back. The adaptation to narrow gauge operation made no difference to ride quality which was found to be identical with that experienced on standard gauge bogies.

Exciting innovation

RoadRailers are being hailed as the most exciting innovation in freight handling this century in Australia. They are particularly suitable for long-distance haulage and give rail a door-to-door capability without the multiple-handling required for containers.

The RoadRailer train, 50 to 100 vehicles long, runs smoothly as a single unit because of the tight



A RoadRailer towing frame under construction at the Islington fabrication shop in South Australia.

yet flexible characteristic provided by the coupling system built into each vehicle. A RoadRailer has a tare weight of about half that of a conventional railway freight wagon, which means the hauled load is more payload than deadweight. This results in substantial savings in locomotive power and fuel use.

Close coupling of trailer units (their bodies are about 25 cm apart) offers total security. Once coupled the trailer doors cannot be opened. Close coupling also reduces wind resistance with a result in fuel economy.

Australian National has tested the RoadRailer at speeds up to 140 km/h. Regular operations are at 110 km/h. Even at these speeds wear and tear on customers' trailers is negligible. Components such as tyres and suspensions are not used at all: the rail bogie does all the long haul work.

A RoadRailer based on dry goods pantechnicon has a tare mass of 9.0t on the road (14.35t on rail) and a gross mass of 35.0t on road (40.35t on rail). Its payload mass is 26.0t. Its length is 12.5 metres, width 2.5 metres, height 4.3 metre above road surface.

The vehicle is destined to open up new freight horizons for rail freight services throughout Australia in the years leading up to the 21st century facilitating an even greater diversification in the range of goods carried by Australian rail services. □

AN's new freight services

Australian National is developing new services in freight transport with the ongoing introduction of a new-generation wagon fleet.

"Five-pack wagon sets, 5-pack well sets and RoadRailers will constitute the core of the National Rail Freight Corporation's (NRFC) modern wagon fleet in the east/west corridor servicing Sydney, Melbourne, Adelaide and Perth," AN managing director Russell King said.

"The corridor is expected to account for two-thirds of the NRFC's total traffic task and revenue.

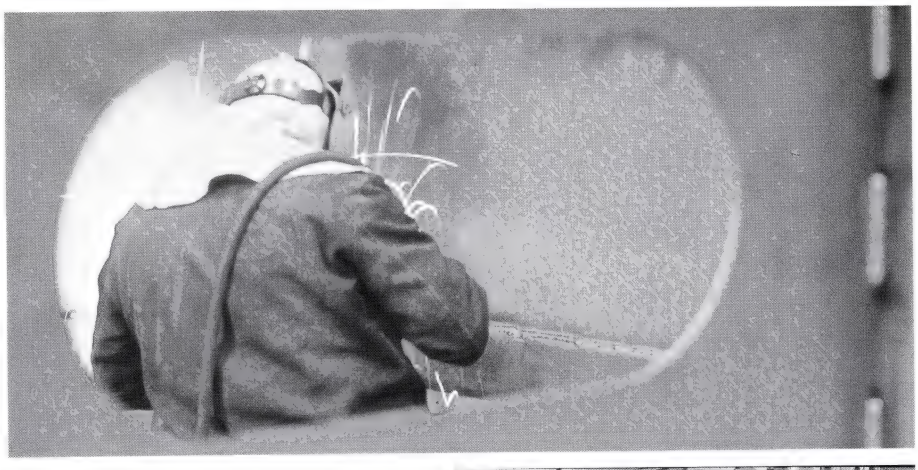
"Five-pack wagons considerably boost AN's ability to handle container traffic, which has undergone a strong surge in recent years. Container traffic through AN's Islington freight centre rose 30 per cent in 1989/90," he said.

The 5-pack system links five wagons by shared bogies, reducing tare-to-gross weight ratios and boosting freight capacity, hence cutting costs. There are 27 5-pack wagon sets now in operation and the current building program will boost the total to 36.

Nine 5-pack well sets, expected to cost around $1.7 million are under construction. These feature five permanently-coupled well units, which further improve freight capacity. Well wagon 5-packs can carry 10 full-height 12.1m containers and operate without constraints on the Adelaide/Perth/Alice Springs routes.

Each platform in conventional 5-pack wagons can carry up to one full-height and one three-quarter height container but cannot be double stacked because of centre of gravity and height restrictions.

A variation on the 5-pack wagon set features a well wagon as a centre unit, allowing further versatility in freight train carrying capacity.



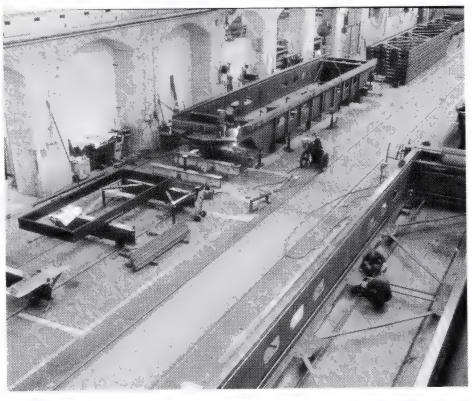
A prototype 5-pack well set has been built and tested, and a further six well wagon sets will be completed during 1991.

The current construction program, being carried out at AN's Islington and Port Augusta workshops has so far put eight conventional 5-pack wagon sets and five sets featuring a centre well wagon into traffic at a cost of $2.3 million.

More than $2 million has been spent to date on the upgrading of the Islington Fabrication Shop which specialises in the fabrication and construction of RoadRailer towing frames, 5-packs and well wagons. Islington provides pressings and details for the assembly of wagons in both Islington and Port Augusta Fabrication Shops.

Six prototype RoadRailers have also been built – innovative road transport trailers than can be transferred directly to rail with no lifting involved. The prototypes are currently being used to break new ground in the Australian freight market and a further ten are set for completion by the end of 1991.

The new units are being targeted at customer-owned operations, following the successful commercial leasing of 5-pack and 2-pack wagon sets. □



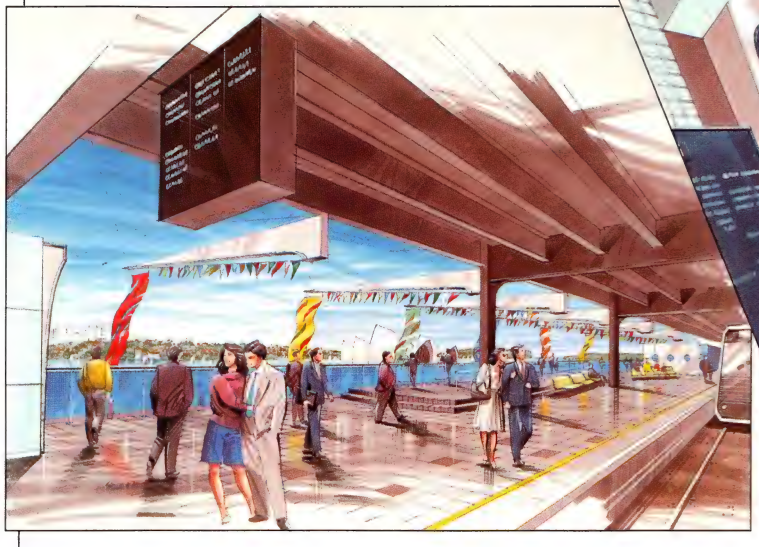


A well wagon (top) under construction at Islington, South Australia. The Fabrication Shop in Adelaide (centre) provides pressings and details for the assembly of 5-pack and well wagons at both Islington and Port Augusta. Completed well wagons (lower) are stencilled with serial numbers after painting in Australian National's corporate colours.



A NATIONAL THEME FOR CIRCULAR QUAY STATION MAKING THE MOST OF BEAUTIFUL HARBOUR VIEWS FROM A PROMENADE PLATFORM. BELOW, AN UNDER-WATER EFFECT AND DRAUGHT-BOARD WALKWAYS.





Sydney's theme stations

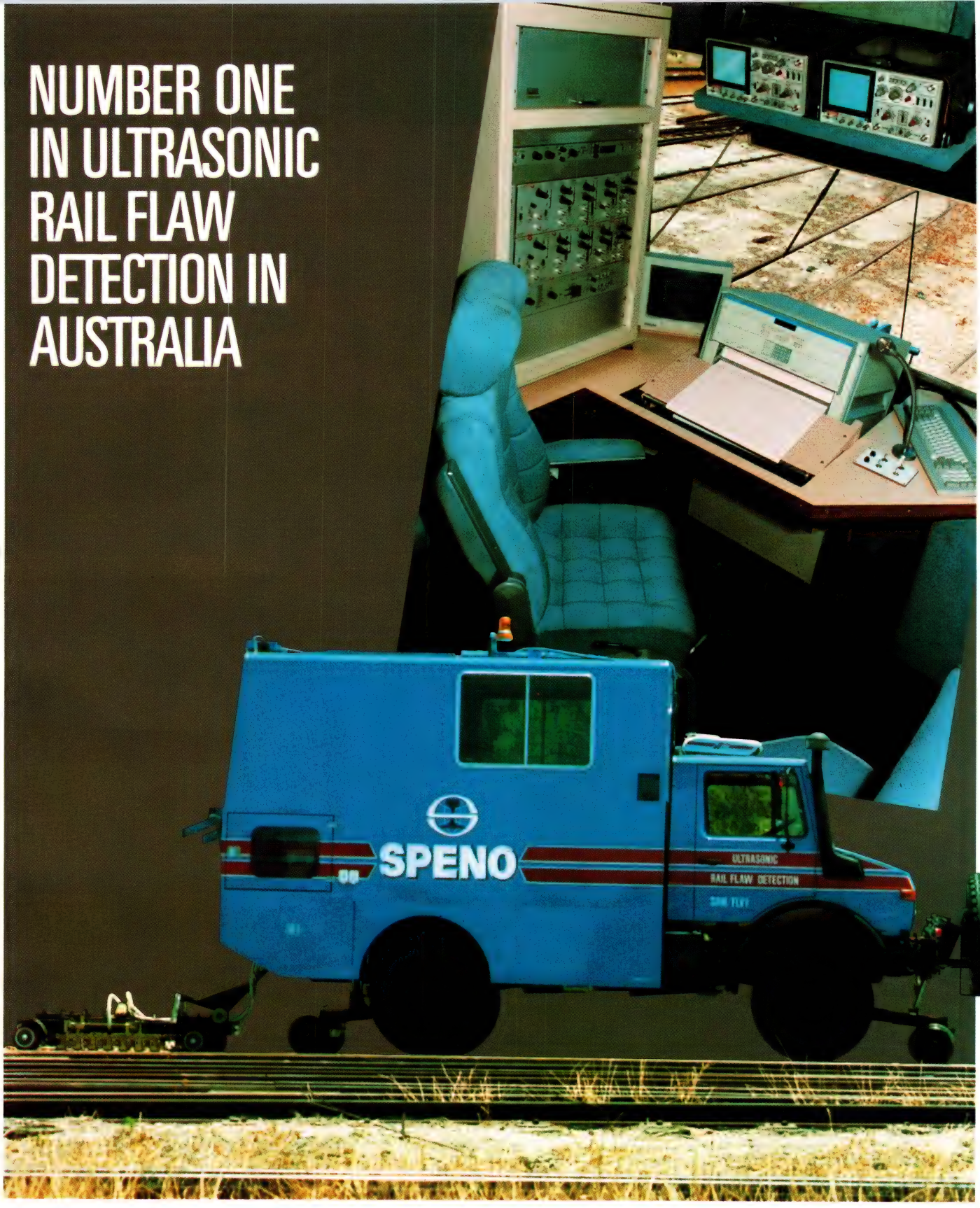
Creating a railway station with a design theme has provided many imaginative opportunities for CityRail in New South Wales which is about to embark upon a rejuvenation program for central Sydney stations and provide customer service at a level not previously experienced in Australia.

Design themes have been developed for each station on the city circle route.

The aim is to provide a series of distinctive station environments which inject a sense of fun and theatre into the everyday routine operation of a passenger rail system.

Town Hall station will be redecorated to reflect an atmosphere of ceremonial tradition. Museum station will have a theme based on items of historical interest. At Wynyard the refurbishing will depict Sydney as a slick business city.

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AUSTRALIA'S LARGEST URBAN RAIL NETWORK, CITYRAIL IN SYDNEY, AND BY FAR THE BUSIEST HAS INTRODUCED SOME NEW AND REFRESHING IDEAS ABOUT CUSTOMER SERVICE FOR WHICH OVERSEAS VISITORS PARTICULARLY ARE GRATEFUL.
THE CITYRAIL HOST CENTRE AT CIRCULAR QUAY RIVALS THE BEST HOTELS AND AIRLINES WITH ITS QUALITY OF SERVICE AND ATTENTION TO THE NEEDS OF TOURISTS.
ATTRACTIVELY UNIFORMED ATTENDANTS DO NOT OPERATE FROM BEHIND A COUNTER – THEY ARE OUT AND ABOUT LOOKING FOR PEOPLE WHOM THEY MIGHT BE ABLE TO HELP.
NEW SOUTH WALES STATE RAIL AUTHORITY CHIEF EXECUTIVE, ROSS SAYERS (RIGHT) INSPECTS THE CENTRE'S RANGE OF INFORMATION LITERATURE, THEN (FAR RIGHT) FINDS HIMSELF WELCOMED BY CENTRE STAFF (FROM LEFT) MANDY ARNOUSH, EMILY SAYER, FIONA SHEEHAN, AND LISA DAVIS.



For St James the idea is to introduce material which shows something of the cultural heart of the city. Central station will have an all-electric environment to capture the feeling of electric entertainment as a part of Sydney's social scene.

Perhaps one of the most interesting theme developments will be that undertaken at Circular Quay railway station. Positioned on Sydney Harbour the station offers great potential for creative imagination blending with the harbour lights and nautical activities.

The application of colour and motifs of various kinds will provide CityRail customers at Circular Quay station with a real feeling for the beauty of the ocean and the harbour.

The theme topics for circle stations will not be restricted to design and decoration of an architectural kind. To complement the theme staff at each station will wear uniforms reflecting their environmental theme. At Circular Quay station, for example, the station master will become 'Captain' with tourists and customers 'piped on board' as shipmates.

Instead of the familiar gong over the PA system announcing arrivals and departures and other information from time to time a 'ship's bell' will precede announcements.

An exciting initiative

As part of the rejuvenation program, Circular Quay station now has one of the most exciting initiatives in customer service today. Appropriately named, the CityRail Host Centre offers top-quality service to visitors to Sydney that is at least equivalent to the best visitor service offered by reputable quality organisations such as the Hilton and Regent hotel chains and the major airlines.

The Host Centre operates seven days a week, 10 hours a day. Information distributed by the centre includes details of CityRail services, entertainment, tourism and special paid company information.

The key to the centre's success is simply its ability to exceed the expectations of all customers – everytime.

To support the Host Centre, two highly-trained staff work together to provide very pro-active service to customers.

Each person is a dynamic service provider, extensively trained in customer service and the art of exceeding customer expectations.

You won't find a CityRail host person behind the counter either. That dull, boring, behind the counter style of service is now gone forever. The new hosting approach to customer service is far friendlier and provides more opportunity for



staff to impress customers. This very action makes people talk about the service to prospective customers.

Under the new hosting practices specialised uniformed staff are out and about among the visitors to the centre breaking down communication barriers in a friendly and efficient way, encouraging people to ask questions about Sydney and its environs. You'll find them near the Host Centre, but not behind a counter.

Hosting staff have a comprehensive knowledge of Sydney, right down to where the best book shop is located. Even knowing why Manly is called Manly is important to some people. If the Host Centre staff do not know the answer, they certainly won't let you leave until they've found it.

The Host Centre is recognised as a leader in advanced customer service in Sydney and in Australia. Some businesses are recognising the quality of service provided and are now looking for ways to introduce the same service philosophy within their own organisations.

The success of CityRail's first Host Centre demonstrates that customer service has a high priority in CityRail. The CityCircle rejuvenation experiment prides itself on offering "triple-A" service to all customers, paving the way in CityRail's push towards becoming a truly world-class railway.

The city circle development will continue over the next six months as a valued testing ground for further advancement throughout CityRail. Doing it EASY, the recently launched mission statement which is doing just that, gives staff a very clear direction and a strong work ethic. Just remember the following:

E*very task must relate to customer service*
A*ttention to detail produces faster results*
S*imple tasks provide major impact*
Y*es, it can be done*

Largest commuter network

CityRail, a division of State Rail in NSW, is Australia's largest commuter network. It handles some 800,000 customers daily with 2000 train services operating around its 300 stations. Customers are met and farewelled by 2000 station staff, each providing service to an average of 400 customers daily.

The Sydney city circle rejuvenation is an experiment demonstrating what can be achieved in a high-volume railway environment with some concentrated effort. Clearly focussed on delivering quality customer service, the rejuvenation is making a significant impact.

Making the right impact is a major task when 370 city circle staff meet and farewell 500,000 customers daily. The staff to customer ratio is 1:1400 per day. (1400 customers means about 200 per hour, or 3 a minute, all day every day). One customer every 20 seconds all day is a huge task when you're looking to have an impact on each one.

Through the rejuvenation, CityRail is agressively pursuing quality customer service initiatives through a range of simple tasks. It is introducing results orientated service standards that are achievable, and providing access to management for all staff through a Management Challenge Fax Hotline (each manager responds without fail by 1 pm the following day).

CityRail is providing high quality customer service training for all staff assisted by Qantas Australia's overseas airline. It is delivering much cleaner stations, providing background music for all tastes, ranging from popular to the classics, allowing quality licensed buskers to roam stations, allowing shoe-shine stands and roast chestnut sellers as add-on customer value and even providing foot massage machines for weary travellers to relax their feet.

The CityRail network covers 1,700 track kilometres including an underground system 20 kilometres in length. It operates 33.9 million train kilometres every year. Rolling stock includes 119 Tangara cars, 776 suburban double deck cars, 344 suburban single deck cars, 243 Intercity double deck cars, 73 Intercity single deck cars, 83 diesel cars, 6 loco hauled cars.

In 1964 Sydney led the world with the introduction of double deck electric passenger carriages, and by 1968 complete double deck suburban electric trains were servicing the suburban network. Air-conditioned versions came into use two years later, initially on the longer runs to towns such as Gosford.

$170 million will be spent on station upgrades and other facilities. Stations are being upgraded to new design standards, with improved station information, seating and signage, new access bridges, subways and car parks, closed circuit television security systems, increased lighting, safety zones on platforms and public phones. □



First generation TGV sets at Gare de Lyon, France.

THE PITFALLS AND PROMISES OF HIGH-SPEED TRAVEL RAISE THE QUESTION –

Is *VERY FAST* the way to go?

By SCOTT JOHNSON

High speed passenger rail services exist in various forms throughout the world. The proposed Very Fast Train (VFT) to link Sydney and Melbourne is the latest incarnation of this concept. Having had the opportunity to sample a number of high speed trains the world over, sometimes in their second generation of development, it is interesting to document the subtle differences between systems, and in understanding the success of high speed trains overseas, perhaps to see why the concept may be a mis-guided choice for Australia.

One of the first "fast trains" was the British Rail HST that our own XPT was derived from – albeit in a much modified form.

The Intercity 125's now form the backbone of British Rail's intercity network, although they are slowly being replaced on some lines by an electric version of the same concept – the Class 91 Intercity 225.

Trials with an even faster electric unit, the Advanced Passenger Train, were terminated some years ago, and apart from the prototype APT



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IN THIS PERSONAL ACCOUNT OF FAST TRAIN TRAVEL, SCOTT JOHNSON, AGED 23, LOOKS AT THE EUROPEAN EXPERIENCE IN RELATION TO HIS GENERATION'S FUTURE PASSENGER TRANSPORT NEEDS IN AUSTRALIA.
"THE CONCEPT OF A SYDNEY-MELBOURNE VFT MAY BE A MISGUIDED CHOICE FOR AUSTRALIA," HE SAYS.
A MUCH-TRAVELLED YOUNG MAN SCOTT HAS ALWAYS BEEN INTERESTED IN RAILWAYS. HE IS A MEMBER OF THE TALYLLYN AND RAVENGLASS AND ESKDALE RAILWAY PRESERVATION SOCIETIES.
HE HOLDS A BACHELOR OF SCIENCE DEGREE IN CIVIL ENGINEERING FROM COLUMBIA UNIVERSITY, NEW YORK, AND IS ABOUT TO COMMENCE A MASTERS DEGREE IN TRANSPORTATION ENGINEERING AT THE UNIVERSITY OF NEW SOUTH WALES.
HIS FATHER, MICHAEL JOHNSON, FORMERLY WITH COMENG IS NOW ON THE NEW YORK STAFF OF AUSTRADE, THE AUSTRALIAN TRADE COMMISSION. WHILE STILL WITH COMENG HE WAS INVOLVED IN OBTAINING THE INTEREST OF THE LONG ISLAND RAILROAD IN DOUBLE-DECKERS. THE WORLD'S FIRST CAME INTO OPERATION IN SYDNEY IN 1964.



"Highland Chieftain," HST 125, about to depart Inverness for London 914 kilometres to the south.

which is displayed at the National Railway Museum in York, the only other APT I saw in my two months in UK was a rusted skeleton outside the works at Crewe.

I rode the HST's on a number of trips, including one of the longest runs in Britain aboard *The Highland Chieftain* from Inverness to London, a distance of almost 1000 km. Designed to run over existing track at a maximum speed of 200 km/h, even economy class in the HST's proved to be very comfortable for the eight-hour trip.

The carriages resisted the tendancy to rock from side to side, there was plenty of storage space between, above and behind seats, which were grouped around tables in pairs of four (although each car had a few "airline style" at each end, facing the centre of the carriage).

On leaving Inverness the train took the best part of four hours to cover the first 300km, winding through the curves and grades of the Scottish Highlands. Once on the double track mainline from Edinburgh to London, however, high speeds were maintained for long stretches at a time, and we arrived within ten minutes of scheduled time.

The trains were well patronised, to the point where vacant seats were sparse on most runs into London.

As the 125's form such a large part of the Intercity fleet, there is no surcharge over the regular fare. Reservations were not always essential, and while there were no problems obtaining them in advance, on one trip my seat had been allocated to two other passengers as well as myself.

The new HST generation

I took one of the new Intercity 225's from London to Leeds to compare the new generation of high





Nose detail of "Atlantique," second generation TGV, at Le Mans after a non-stop journey from Paris Montparnasse.

speed trains. The 225's are true "push-pull" trains with only one locomotive, permanently coupled at one end of the train; the other end has a streamlined driving trailer for running in "reverse".

These new sets are made up with BR Mk IV coaches, and for my money, they were not quite as good as the Mk III's used on the 125 sets. There did not seem to be as much legroom, and the ride was not as smooth.

Of course, our own XPT's are modelled on the 125's although in the areas that are of concern to passengers – the cabin and bogies – they are home grown. On a ride from Sydney to Bathurst, the first thing that struck me was that our first class coaches were only of similar comfort to the British economy class. There was no three across seating, although the more important pitch allowed generous legroom.

The ride was not as smooth as the British counterpart, due in the main to the track condition and alignment. This also precluded high speed running for most of the trip, except for a short stretch in the outer Sydney suburbs, where for a brief time the XPT felt to be the equal of its British cousin.

While mine was only a four-hour trip, I wonder how people would feel after a ten or twelve-hour marathon to Melbourne. After riding the sitting stock that is used at the moment on both Intercapital Daylight and Melbourne Express (which is decidely uncomfortable for what is at least a thirteen-hour trip), I am not sure which would be the lesser of two evils.

The current state of the art in fast trains is the French TGV. With a top speed of 300 km/h or greater these are a marvel to behold. On a trip from Paris to Lausanne, our train was formed of two eight-car (plus a locomotive at each end) sets coupled together to make one very lengthy and extremely fast, ship of the land.

Running on specially-built alignments, the ride on straight sections at any speed was as smooth as they come. These first-generation TGV's seemed to glide on the rails, and over the points (which could not be felt as they were crossed), and accelerated from station stops with a vengeance.

Curves, however, seemed to be the TGV's undoing.

The carriages swayed dramatically as we swept around bends at speeds approaching that of an aircraft at take off. Anything loose on the tray in front of you was destined to be thrown off to one side. Drinks were especially a concern in this regard. Seating was adequate, but with three across seating at a reasonable premium above economy, first class would be a recommended option (as would the Wagon-Lits catering).

Not a vacant seat

Reservations on all TGVs are essential, the trains all being "complet" (full) departing Paris. I don't recall seeing a vacant seat on the TGV's in which I travelled. Despite a small surcharge over regular fare for use during peak periods the French are using these trains to commute hundreds of kilometres, and the trains are proving one of the nation's biggest money-earners.

Routes are being expanded in all directions to cater for the demand and a new route to the north is nearing completion; to work in with the Eurotunnel I would imagine.

The reservation system is, however atrocious. Seats assigned by a SNCF office outside of France were in one instance the wrong class, and on the return leg, for a fictitious train.

The "old" orange TGV's run in the south and east, while a second generation, the silver and blue *Atlantique* head west and southwest. I took a short (fifty minute) trip to Le Mans to sample the latest French thoroughbred – fresh from breaking a world speed record at the time of my visit – a journey that required a three-hour return on the regular SNCF "express".

Having learned their lesson on the original, France's new TGV's have trays with cutouts for food and drink containers. The swaying has been reduced, and the ride is still billiard table smooth.

One disturbing aspect developed outside of Paris, however, as we passed through a number of tunnels at high speed. The air pressure apparently is unable to equalise as the train is moving so fast in the single track tunnel tube, and the resulting rapid increase and decrease in air pressure inside the carriages was quite uncomfortable.

I looked around and noticed a number of people who seemed to have experienced a similar sensation. Perhaps as speeds increase on these trains we will have to consider pressurising the cabins, much like an aircraft, to avoid this problem.

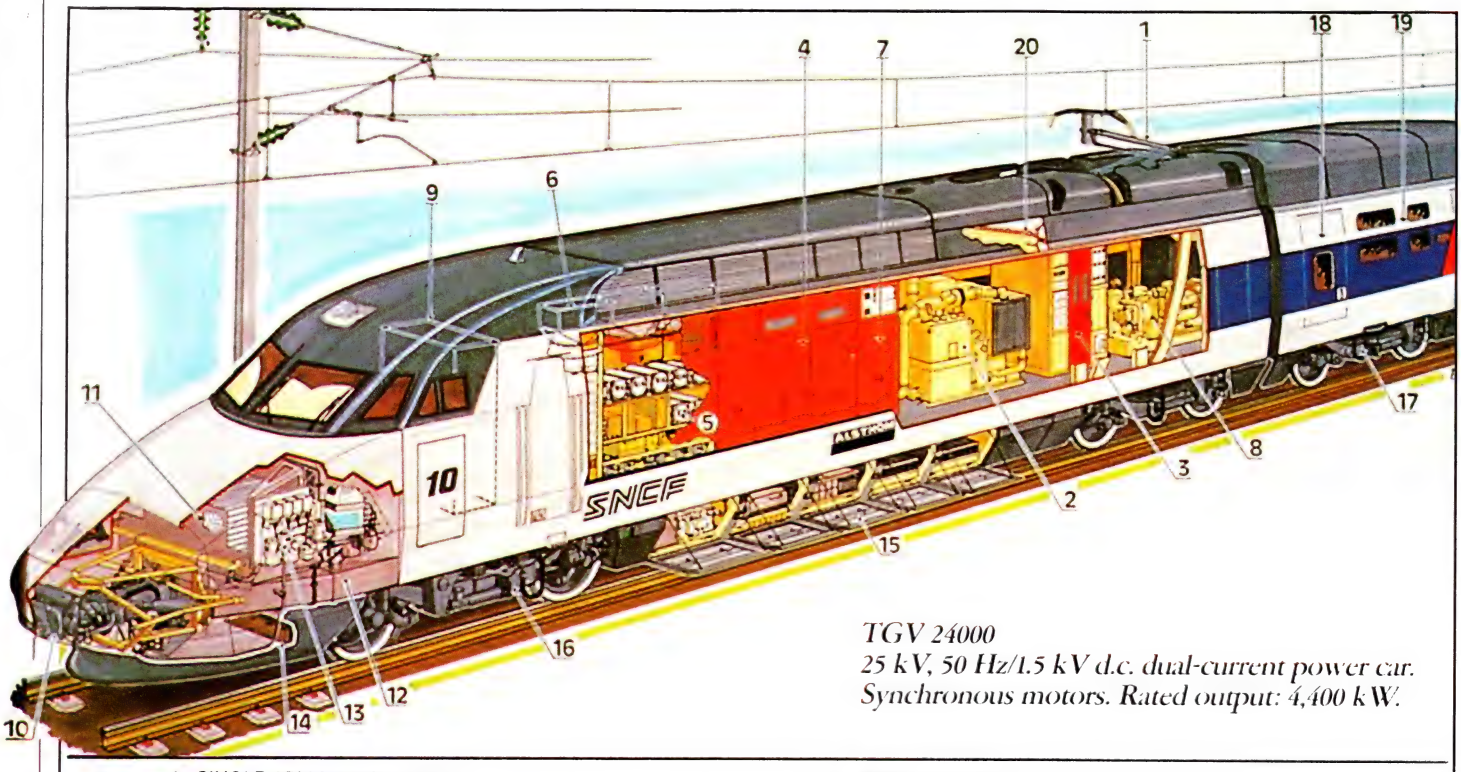
One final problem that the TGV has bought with it is noise pollution. While the trains are electrically hauled, the locomotives themselves emitting no more sound than any other of comparable power, the French have taken drastic measures in the form of sound-reflecting fences of unusual shape and alignment trackside to contain or reflect the noise for the run over the rails outside of Paris Montparnasse station.

The trains also seemed to be impolite under brakes; I witnessed the arrival and departure of a number of units at Le Mans, and all screeched obtrusively.

Pitfalls and promises

So there we have a sample of three high speed trains that are operating today, each with pitfalls and promises. And we may be about to spend millions of dollars on our own train that will eclipse all of them. I have to ask myself: "Who will ride this train?"

On my journey from Inverness, only a handful of people were travelling the 1000km to London, however as the train stopped at many large urban



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How BHP to

The majesty of steam is truly depicted here in this 1935 photograph of the BHP train from Iron Knob comprising locomotive No. 8 with 33 ore cars and a brakevan.



Is *VERY FAST* the way to go?

centres, it was well-filled by journey's end. Similarly, my train to Lausanne did not empty out appreciably until well into its three-hour journey. On a run from Sydney to Melbourne the majority of people join the train in Sydney. There just isn't the widespread base of people to justify (or necessitate) intermediate stops.

Which mode of transport would people forgo to ride the VFT regularly?

The pro-rail argument is that a train will bring you into the city centre, while a plane leaves you on the fringe of the city and so businessmen will choose the train. True, maybe, but no-one (not even the French) could afford to buy up land for a high speed corridor into the city centre, so our VFT won't be pulling up from 500 km/h to platform one at Central or Spencer Street.

Then there is the question of frequency; if a business person misses a flight due to a delayed meeting, he can generally pick up the next one an hour later. The British, with all their population, only run four or so trains a day each way between London and Inverness; I can't see Australia justifying anything more than the current two trains a day in each direction between capitals – not unless we are prepared to run them half empty, and then the question of ticket prices and economics takes over.

To lure passengers, the price must undercut or at least match the airlines. Can that be done when capacity patronage cannot be assured?

We are faced with a unique dilemma in Australia, in that we are the most urbanised nation on the planet. While in theory we might have the population to support the VFT, they are not spread out in towns and villages between Sydney and Melbourne as they are in Europe.

To compound the problem, the distance between the two centres in question is just too far for practical ground travel at current technical limitations. Ideally, the distance would have to be half what it is – such as the Paris to Lyons or London to Edinburgh runs – before travel times and speed made it competitive with the airlines.

Given these problems that were not a factor with its northern hemisphere cousins, I cannot help but feel that the VFT will be a more expensive version of the Monorail in Sydney: technologically nice to have, something that a lot of people wanted at the time, but once built, a novelty few people actively patronise. □

helped rail expand

One of the largest private railway companies in Australia is The Broken Hill Proprietary Company Limited, BHP as it is so widely known as today, which operates extensive rail services at its Newman, Goldsworthy and Iron Knob mining establishments as well as heavy axle load railways at each of its three integrated steelworks.

BHP supplies a range of railway products including rail, steel sleepers, sleeper plates, and the steel sheet itself from which are made the many other components needed by all the rail systems in Australia.

As a railway operator, its long ore trains laden with exports regularly streaming to the coastal shipping points in the north-west of the continent, BHP is a user of its own rail products in some of the harshest and most difficult climatic environments for rail in the world.

The export ore trains are one of the lifelines of the Australian economy.

Less well known perhaps is the fact that BHP also has a heavy commitment and involvement in railways research conducted through its scientific research facility in Melbourne.

While the present-day operation of BHP's rail services and their contribution to Australia's export trade in particular are well documented on film, video and in print, and are relatively well known around the world, the early links between the company and railways are often forgotten.

The link between Australia's largest company and rail transportation, however, was forged more than 100 years ago when the Broken Hill Proprietary Company Limited was young. BHP was floated on 10 August 1885 to mine silver and other alloys in the Broken Hill area.

Operating a heavy industry in such a remote region brought with it tremendous transportation problems, and when the railway arrived in Broken Hill in 1888, BHP's mining activities were well established and the company became a major rail customer. Initially oregon timber was brought in by rail from the coast, as was coke to feed the smelters. The initial outbound freight was bullion silver, with larger quantities of the less valuable lead.

At first the quantities were small. Railway wagons were transported to the mines for the Silverton Tramway Company by the South Australian Railways and any shunting required was done by horses. But the need for a shunter quickly became apparent as the mining operation grew.

BHP placed an order with Beyer, Peacock and Company of Manchester, England for a locomotive which was similar to several in use by the Silverton Tramway Company (STC) and South Australian Railways (SAR). The engine was built in 1891, receiving builder's number 3357, and arrived at Broken Hill in May.

A powerful locomotive, it could easily out-perform a whole team of horses.

However it was also much heavier and the mine sidings, which were built with very light rail and poor subgrade, began to suffer under the load.

At the same time the South Australian Railways had several small locomotives of the 0-4-4T 'V' class lying idle. They had been imported to work the Kingston line in the south-east of the State, but had proved too small for the task. The diminutive class was also built by Beyer, Peacock. The quick solution was a direct swap, and the locomotives were exchanged in July 1892.

During the negotiations for the swap, BHP ordered a small locomotive from Nasmyth Wilson, also of Manchester. The locomotive was built in 1892 and was allocated Nasmyth Wilson's number 441. It arrived in Adelaide and was sent to Terowie to Broken Hill under its own steam. It entered service on 12 February 1893 displacing the South Australian engine V11 from shunting duties. BHP therefore returned V11 to the SAR and asked that its engine be put in first class condition and returned.

BHP accepted its 2-6-2 tank engine back in September 1893 and allocated it number two. It was transferred to the Iron Knob 'tramway' in 1902.

The Nasmyth Wilson engine spent some time from 1901 to 1902 on construction work from the Iron Knob, but was returned to Broken Hill where it remained until withdrawn in 1935 at the cessation of BHP operations at Broken Hill. It and another second-hand 'Y' class No 61 purchased from the SAR in 1926, were scrapped in 1939, at a time when BHP was purchasing more locomotives from the other Broken Hill mines for its expanding Whyalla operations.



Contrasting with the 1935 ore train on the previous pages are (right) the ore train leaving Iron Knob in December 1981, and (lower) the diesel-powered train from the Knob in 1956. Top right – Unloading the first diesel hydraulic locomotive at Whyalla blast furnace wharf in March 1962. Lower right – Loading ironstone at the Iron Monarch bins in December 1981.



The Iron Knob tramway

To use the word "railway" when referring to BHP's South Australian rail operation is technically incorrect. By Act of the South Australian Parliament, BHP's rail operations are legally "tramways" and are operated in conformance with the Tramway Act of 1884 even though modern diesel locomotives are in service.

A search of early records of the region by Sir Harold Raggatt, published in 1969, concludes that the 'Iron Knob in South Australia was named and recognised as a large deposit of ironstone between 1848 and 1854'. It is thought that some prospecting was undertaken in the area in the 1860s shortly after the discovery of copper deposits at Wallaroo and Moonta.

Activity in the area for many years was fragmented and spasmodic and then on 12 April 1897 Mr Hale, assayer for BHP pegged nine claims each of forty acres on the Knob and at Monarch. The claims were registered three days later, thus giving the BHP company preferential right to leases.

Up to this time BHP had obtained the ironstone, which it needed as a flux in its smelting operating at Port Pirie, from many districts in South Australia, but the ironstone deposits were not sufficient to meet long-term needs.

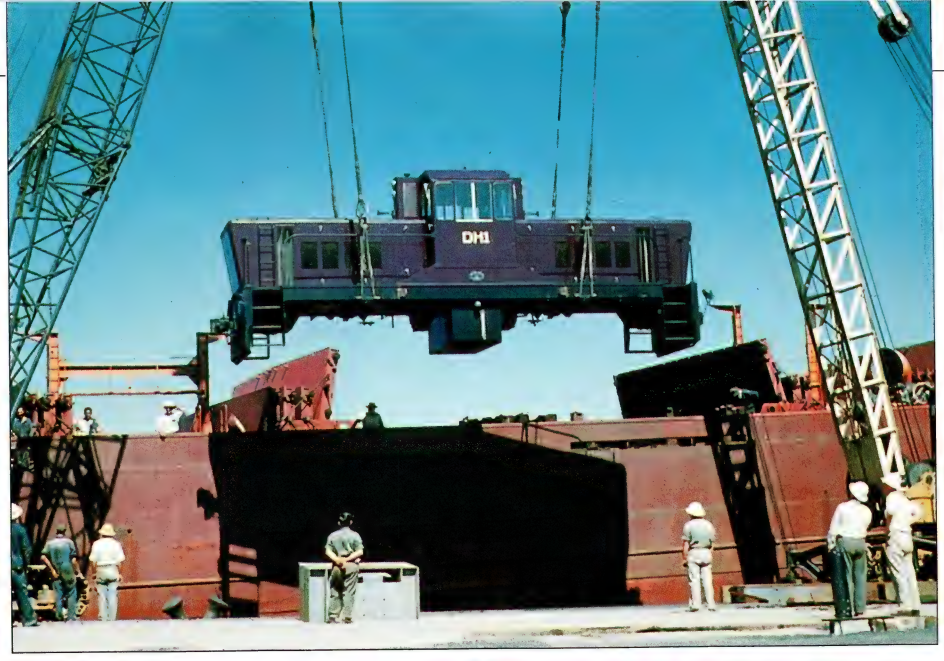
After an enquiry by the mining warden, the leases were granted and quarrying commenced. The ore was taken out by bullock team to Port Augusta, by rail through Pichi Richi Pass via Quorn to Orroroo to Petersburg and thence down the Broken Hill railway line to Port Pirie.

Needless to say, this circuitous route was not only time-consuming, but also very expensive. The solution was obvious; a rail link to the coast.

Should the line go to the coast and the ironstone be taken by sea to Port Pirie? Or, should the line go to Port Augusta and link with the existing railway? BHP were of the opinion that a rail link to the coast and barges were the best option.

A petition was presented to the South Australian Legislative Council on 28 September 1900 by the Hon John Lewis, MLC (father of Essington Lewis – later general manager of the







company) from three directors of BHP, seeking leave to introduce a Bill for the construction of a "tramway" from Hummock Hill to Iron Knob and jetties at False Bay.

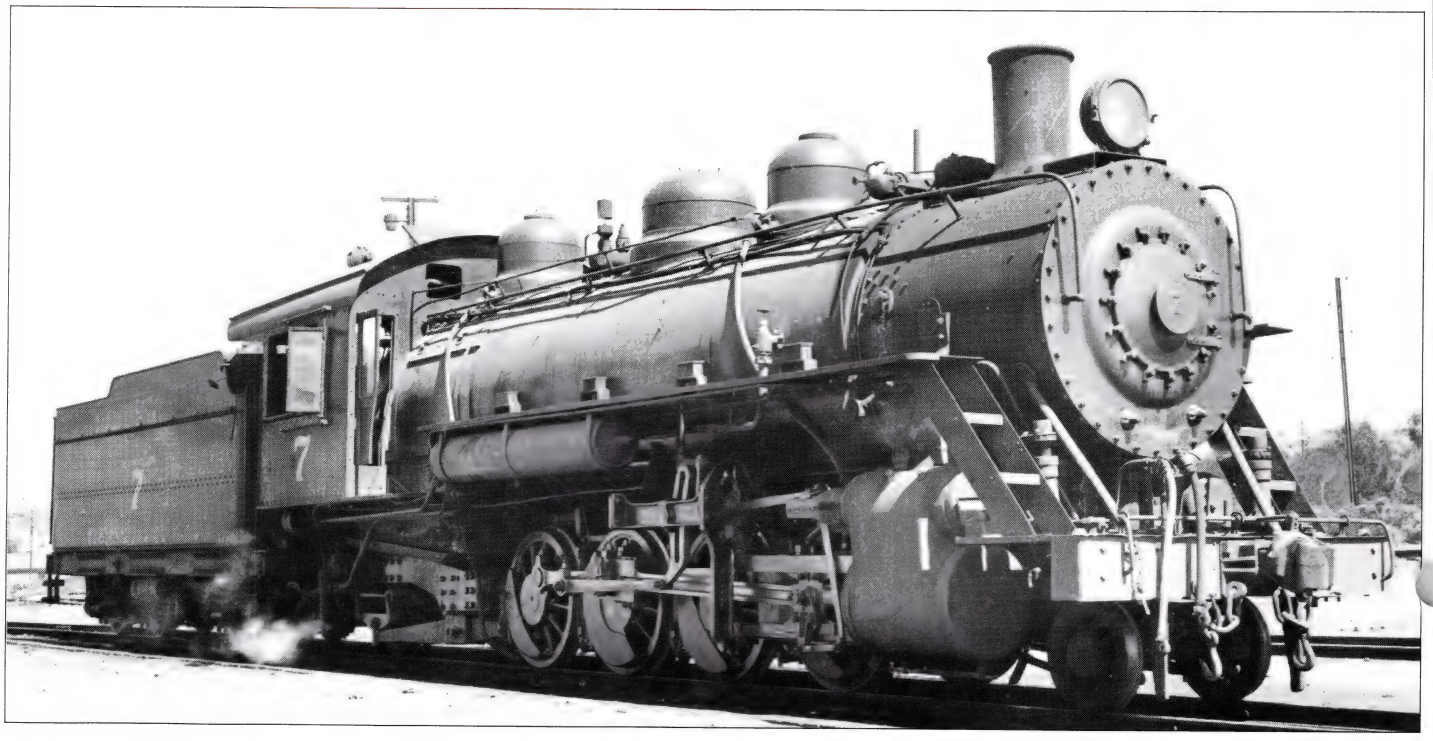
Petition is granted

The petition was granted and a Bill was introduced. In typical parliamentary fashion it was referred to a select committee for report. In a report to Parliament issued in November 1900, the committee decided in favour of the Hummock Hill proposal and the *Broken Hill Proprietary Company Limited's Hummock Hill to Iron Knob Tramways and Jetties Act, 1900* was duly passed and assented to on 5 December. It authorised the company to build and operate a tramway subject to the general provisions of the *General Tramways Act, 1884.*

The Bill provided for a single line of tramway 33 miles (53 kms) 5 furlongs and 4.11 chains in length with the sidings as shown in the deposited plans. The Act restricted the tramway to a gauge of 3′6″ (1 m approx) with iron or steel rails of at least twenty pounds (9 kgs) to the yard (0.9 m). No carriage was permitted to be in excess of eight feet (2.44 m) wide and no engine or carriage should 'travel at a greater speed than twenty-five miles (40 km) an hour'.

The tramway was required to be completed within three years of the passing of the Act and had to carry passengers and goods as well as flux; charges were not to exceed those of the Government railways. A deposit of £1,120 was required to be lodged with the treasurer, being two per cent of the estimated construction cost, as a surety on the completion of the project.

The Governor and/or the South Australian Railways Commissioner were entitled, at any time, with the issue of twelve months notice of their intention, to purchase the lease granted to the company, as well as the tramway, jetty and all rolling-stock, buildings, and so on. The price to be paid would not exceed the actual cost of construction less a fair deduction for wear and tear and depreciation.



Locomotive No. 7 in the Whyalla, South Australia, yards of the Broken Hill Proprietary Co. Limited.

These were much less advantageous terms than those negotiated between the Silverton Tramway Company and the New South Wales Government. In the event of the company ceasing to operate the tramway for any continuous period of three years, the whole would pass into the possession of the government, at no charge.

A party, led by the company surveyor George Walls, was transported across the gulf on 10 January 1901 on the *Cadell*; leaving Port Pirie about six in the morning and arriving at Hummock Hill in mid afternoon. After a camp had been established, construction commenced on the tramway that month. The rails used were of 40lb (18 kg) per yard (0.9 m), resting on 8″ x 4″ x 6′6″ (20.3 cms x 10.2 cms x 1.98 m) sleepers. The track was lightly ballasted with the beach sand.

By March 1901, the construction had progressed to an extent that horse traction was no longer sufficient to keep up with the needs of the construction crews. Arrangements were put in hand to have the Nasmyth Wilson engine transferred from Broken Hill. A problem arose however, associated with the fact that Broken Hill was in the colony of New South Wales, whereas Hummock Hill was in South Australia.

When the engine eventually reached Port Pirie, the Sub-Collector of customs refused to allow the engine to be transferred across the gulf until import duty had been paid.

The company requested that a draw-back on this duty be allowed upon return of the engine to Broken Hill when the construction was completed. The Sub-Collector refused, on the grounds that the locomotive would then be second-hand. BHP offered to use the engine 'in bond' at Hummock Hill for six months and then return it to Broken Hill. Negotiations lasted from 13 March until 4 April, when the embargo was lifted and the engine loaded aboard the *Gwydir* for Hummock Hill.

The first

The unit was landed on 9 April 1901 along with seven 'C' trucks at a cost from the lightering of 3 shillings and 9 pence per ton. The trucks were of an SAR pattern purchased from STC and no duty was paid on them.

This was the first 'train' on the Iron Knob tramway. More rails from America in 30 ft. (9 m) lengths were received in early May and more open wagons and tank trucks arrived later in the month.

Subsequently, three bolsters and two 'C' trucks were hired from the SAR at a cost of five shillings per day, and six bolsters (built in Melbourne for STC) and two 'C' trucks arrived in early June.

Towards the end of June arrangements were made to send six South Australian built trucks to Hummock Hill so that six Melbourne-built trucks could be transferred back to Silverton. This was to avoid attracting customs duty that had never been paid on them.

Operating on poor water

By August the strain of operating on poor water and limited maintenance facilities was starting to

tell on the saddletank engine and urgent requests for a replacement were made. Replacement was already on the way.

Envisaging the need for another engine, the company had placed an order with Andrew Barclay of Kilmarnock, Scotland. The 0-6-0 tank engine numbered 914 of 1901 and 3′4″ (101 cms) driving wheels, 14″ x 22″ (35.5 cms x 55.8 cms) cylinders and cost £2,103. It was landed at Port Adelaide on 30 October 1901, but during unloading was dropped about 10 inches (25 cms).

No damage was found and it was taken on to Port Pirie to be assembled, all except for the wheels, and sent across to Hummock Hill on 15 November 1901. It was named *Iron Monarch* but became more commonly known as *Kilmarnock* after the manufacturer's works.

Just prior to this delivery the saddletank engine had the distinction of hauling the first load of ore along the line. Reports written in the 1920's state that the first shipment went down the line on 28 August 1901. Although this approximate date is supported by contemporary letters, the event received no special mention.

It is reported that though by mid September 300 tons (305 tonnes) per day were being used at Port Pirie, the locomotive could haul only 60 tons per load and could bring down only one load per day without disrupting the ballasting operation.

The first shipment of general goods for the public was carried over the line on 1 October 1901, a load of hides and skins from Mr J. Cook of Middleback sheep station.

Passenger fares were set on 10 March 1903 at 2 shillings and 6 pence each way, general goods

IT WAS THE BUILDING OF RAILROADS, INITIALLY FINANCED BY SPECULATIVE FINANCIAL FLOATS ON THE LONDON STOCK MARKET, WHICH OPENED UP THE INTERIOR OF AUSTRALIA LINKING THE GOLD-MINING TOWNS AND THE PASTORAL WHISTLE-STOPS WITH THE SEABOARD CITIES. ISOLATION AND DISTANCE WHICH CHARACTERISED LIFE IN THE EARLY DAYS OF SETTLEMENT ON THE GREAT SOUTHERN CONTINENT DIMINISHED RAPIDLY WITH THE ADVENT OF RAIL. POLITICAL PRESSURE WAS INTENSE AS SMALL COMMUNITIES COMPETED FOR BRANCH LINES. SO JEALOUSLY DID GOVERNMENTS LATER SAFEGUARD THEIR STATUS AS RAIL OPERATORS THAT A PRIVATE COMPANY, THE BROKEN HILL PROPRIETARY COMPANY LIMITED, WAS GRANTED APPROVAL TO OPERATE A PRIVATE LINE WHICH HAD TO BE CALLED A TRAMWAY.

public freight in 1901

reviewed to be 15 shillings per ton, returned empties 7 shillings and 6 pence per ton, wool and skins 12 shillings per ton, with a shilling per ton charged for loading and unloading. These passenger fare rates were within the SAR rates of 3 shillings and 4 shillings and 8 pence return at the time, and were thus not contravening the Act.

A special train was run on Easter Monday of that year at single fare for double journey. The officer in charge at Hummock Hill was instructed to "make the 'C' trucks as comfortable as possible for the passengers" and was offered some extra chaff bags for seats.

Kilmarnock was gratefully received at Hummock Hill and immediately placed into traffic to relieve the ailing *Little Bessie.* It quickly demonstrated its capabilities by bringing a rake of sixteen loaded wagons down from the mine on 16 December 1901 and was expected to be able to manage twenty; representing a load of about 200 tons compared with the Nasmyth Wilson's 60 tons.

Kilmarnock did not prove to be the unqualified success that was expected. It also suffered from the arduous conditions under which it was expected to perform and developed serious boiler leaks by 2 January 1902. The leaks were so serious that it was necessary to obtain 150 new tubes for the boiler before the end of that month, that is, when it was less than three months old.

Once construction of the tramway was completed, a greater quantity of ore could be shipped. *Kilmarnock* took its place as the leading locomotive with *Little Bessie* being used in clearing the remains of construction and as a very second rate back-up.

Little Bessie was also used in special duties such as hauling the general manager to Iron Knob in August 1902 when a train was not otherwise running. Even the general manager rode in an open wagon at that time, although it is surmised that he was provided with a chair rather than a chaff bag to sit on.

Rolling stock was very basic. By July 1902, there were 52 hopper wagons in the fleet, of two basic types. Tarrawingee trucks were purchased from the Tarrawingee Tramway, which carried limestone flux from quarries north of Broken Hill to the smelters at the 'Silver City', before smelters were established at Port Pirie.

The second class of trucks were known as 'German Hoppers', which is thought to be a reference to their origin, although their official source has not been established.

BHP's steam special crossing the northern tip of Spencer Gulf, South Australia, to celebrate the opening of the Port Augusta-Whyalla line in 1972.



PHOTO PETER WARBURTON

The original ore trucks were without brakes until early 1902, when screw brakes were fitted to the 'German Hoppers'. The guard then rode on a chaff bag in the last truck and screwed the brakes on or off as called upon by the driver's whistle code.

Passengers apparently had some priority over livestock; the first mention of a passenger carriage occurred in August 1903, but an agreement to modify a wagon to prevent sheep from jumping out was not obtained until 1904.

Iron ore traffic grew steadily over the first ten years of operation and eventually reached the limit of two engines. To supplement them, a third engine was brought down from Broken Hill. This engine, Beyer, Peacock number 4723 of 1905, was of similar size and appearance to No 2 'Beyer Peacock', apart from saddle tanks instead of side tanks.

Modernisation of the quarries

Until 1926, quarry operations had changed very little since the immediate post-war days and loading was still done by hand shovel.

There were two tracks in the quarries to serve the steam shovels on mullock shifting and a further 84 tracks to serve the needs of the contract shovelmen. Compressed air winches had replaced some of the horsepower on the longer hauls, but the compressors were nearing their limits.

The company purchased four Fordson tractor locomotives, which entered service in June and August 1927, displacing four air winches. Unfortunately they almost immediately exhibited radiator problems. Also purchased at that time was a second-hand steam engine from Millers Machinery Company of Melbourne. It is reported to have entered service on 27 July 1927, and became locomotive No 9.

Steam locomotive No 9 had a very short career in the quarry. Its condition was very poor and drawings were made for a complete set of valve gear in February 1928, but they were probably never used.

The electrification was complete in 1928 and a boiler inspection set for 22 June was never carried out.

At Iron Knob's 'E' quarry, the broken ore was shovelled by three Bucyrus-Erie shovels of four cubic yard (3.6m) shovel capacity, into two quarry trains. Each train consisting of five or six 30-ton ore cars, ran on track parallel to the face. This was opposed to the tracks running perpendicular to the face in hand-loading operations. Each train was hauled by a 22-ton 600 volt Metropolitan Vickers electric locomotive.

The ore cars had a special side tipping mechanism operated by an overhead gantry crane and discharged into the hopper of a jaw crusher. Movement of the new ore cars in 'E' quarry was made predominantly with the two new Bo-Bo electric locomotives E1 and E2 from Metropolitan Vickers.

When no overhead was available because of track shifting as the quarry face advanced, a petrol-electric locomotive purchased from Davenport Locomotive Company, Iowa, USA, was used.

'E' quarry, opened in 1928 as part of BHPs modernisation, was some 100 feet (30m) above the old 'A' bench and 'B' bench (on the other side of the hill), which had been opened up in 1914 to supply the steelworks in Newcastle. By 1936 it had produced seven of its estimated ten million ton capacity and what remained contained valuable concentrates of manganese, which were useful for blending with leaner ores to achieve best blast furnace feed.

Whyalla gets the go ahead

The BHP board approved a recommendation that a blast furnace be built at Whyalla and construction began in 1938. Keeping in mind that a blast furnace consumes materials in large quantities and also produces large quantities of slag waste and iron for shipment, it was decided


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Why the diesel tax for rail is unreasonable

During the financial year 1989/90 Australian rail services paid a tax of $126 million on diesel fuel used in locomotives. Two major investigations have recommended to the Federal Government that the tax be dropped. The Interstate Commission recommended that:

- ☐ Rail systems be exempt from paying excise duty on diesel fuel, except for an amount designed to compensate the community for external costs.
- ☐ The Bureau of Transport and Communications Economics investigate the valuation of rail externalities in Australia.

('Road Use Charges and Vehicle Registration: A National Scheme' March 1990, Recommendation 6, Volume 1, page 224.)

The Industry Commission stated: "The Commission recommends that railways should receive a rebate of diesel fuel excise for the off-road use of diesel"

('Rail Transport' draft report 17 April 1991, Recommendation 6.2, Volume 1, page 118.)

The fuel tax is claimed by road to be a method of road cost recovery. That is, a way of paying for the maintenance of roads caused by damage from vehicles. Rail, in contrast, pays for complete maintenance of its tracks.

A second view, is that fuel tax is a resource tax. Such a tax is designed to reduce consumption. In this case both road and rail would pay the tax. But road vehicles would have to pay for road damage by higher vehicle registration fees.

What effect does fuel tax have on marketing interstate rail freight in Australia?

"The fuel tax represents six per cent of our costs of moving freight" says Malcolm Cameron, National Freight Coordinator. "On a marginal basis it is about nine per cent of our costs.

"This tax component of our costs is clearly significant as we quote on a commercially competitive basis for freight. We are pleased that these two enquiries have recommended the tax be dropped."

One interesting piece of information is that rail services in Australia use 525 million litres of diesel fuel per year for all freight and passenger services, or 0.1% of the volume of Sydney Harbour at 505,000 million litres. Road uses 22,000 million litres per year or 4% of the Sydney Harbour volume.

► FROM PREVIOUS PAGE

that the best site for the blast furnace would be to the north of the existing tramway, powerhouse and workshops.

Slag handling at the steelworks was initially carried out by locomotives Nos 1 and 2, which were modified by the addition of the necessary pipework and valves for them to operate the slag cars.

Two further locomotives were obtained from Broken Hill in 1940, to assist with the work.

The war years (1939-45) were a busy time for Whyalla and its quarries. The many developments which had taken place had put a strain on the people and the plant. Following the Japanese surrender, a public celebration was organised at Whyalla in the form of a picnic at the 23 mile location.

A special picnic train was organised. The response was overwhelming and the train consisted of every truck capable of carrying people, from the coach and brakevans to the stores vans and a number of open 'C' class trucks. The celebrations were reported to be a great success.

In the early 1950s BHP began to consider the possibilities of alternative locomotive power types as replacements for the ageing mainline steam locomotives. Ten manufacturers were invited to quote for the supply of diesel electric locomotives suitable for operation on the Iron Knob tramway.

The successful tenderer was Clyde Engineering of Granville, New South Wales. Clyde offered their model G12B, a locally built Bo-Bo diesel electric powered by an imported EMD 567C V-12 two stroke diesel engine. The same unit was supplied to the Queensland Railways in 1955 as their 1400 class (A1A-A1A).

It was by far the cheapest unit, yet was still, in the opinion of the Whyalla investigating team, the best unit.

At the same time as this was happening, Government legislation required quarry faces to be no higher than 65 feet (19.8m). For BHP this meant splitting the work benches in two, doubling the amount of track. The change in operation rendered the electric engines ineffective because of steep grades in the new-look quarries.

The solution was to purchase two diesel locomotives similar to but smaller than those that would operate on the main line. The new units were the Clyde G8 model and these arrived in October 1956. By the end of 1957 the company was secure in its use of diesel traction.

With the transformation of BHPs rail services to modern forms of locomotion came the end of a significant era in the development of railways in Australia, an era in which government and private enterprise worked hand-in-hand to assist the establishment of a private railway system to serve the needs of the nation. ☐

(This article was based on the text of "BHP Tramways Centenary History" by David Griffiths, published by Port Dock Museum, Box 624, Port Adelaide, SA 5015. Enquiries to Bob Sampson (08) 341 1690. Pictures are by David Griffiths.)

Australia ranks fourth as cotton exporter

Australia's cotton harvest runs from April to August and this season is expected to reach a record 1.5 million bales (340.5 million kg), between $800 million and $1,000 million.

One thousand growers, in an area from the Darling River near Broken Hill to the Drummond Ranges near Rockhampton, Queensland, planted more than 250,000 hectares of cotton.

The cotton plant grows from September to March and is a variety of hibiscus about a metre high at maturity.

Almost all Australian cotton has to be irrigated, but experts believe there is good potential for large-scale dry land cultivation of the crop.

It is Australia's fourth biggest source of export revenue and has increased in value from $350 million in 1985. Australia is now the fourth largest cotton exporter in the world after the USA, USSR and Pakistan.

Seventy five per cent of Australia's cotton is exported and ninety per cent of that goes to Japan, Taiwan, South Korea, Indonesia and Thailand. In return Australia imports about 800,000 bales of finished cotton goods.

Much has been written about Australia's recession and how some rural economies are sinking, but for many people in the north west of New South Wales cotton is a life raft.

Moree, Merrywinebone, Wee Waa and Trangiel Warren are in the middle of the State's cotton belt and for many people there times are booming during this year's biggest ever harvest.

Cotton prices are expected to rise by 13 per cent this year.

Next year, more wheat and sheep farmers are likely to sow some of their land to the crop. Roadsides in the region seem to be covered in snow – the result of raw cotton falling from trucks heading for cotton gins.

Rail-only to coast

Once cotton is ginned at Moree and Wee Waa it is a rail-only operation to coastal ports – replacing 9,600 semi-trailer movements on NSW roads.

Bryan Parry, who manages NSW Freight Rail's cotton transport business, says dedicated trains are programmed to run from Sydney to Moree and Wee Waa when required.

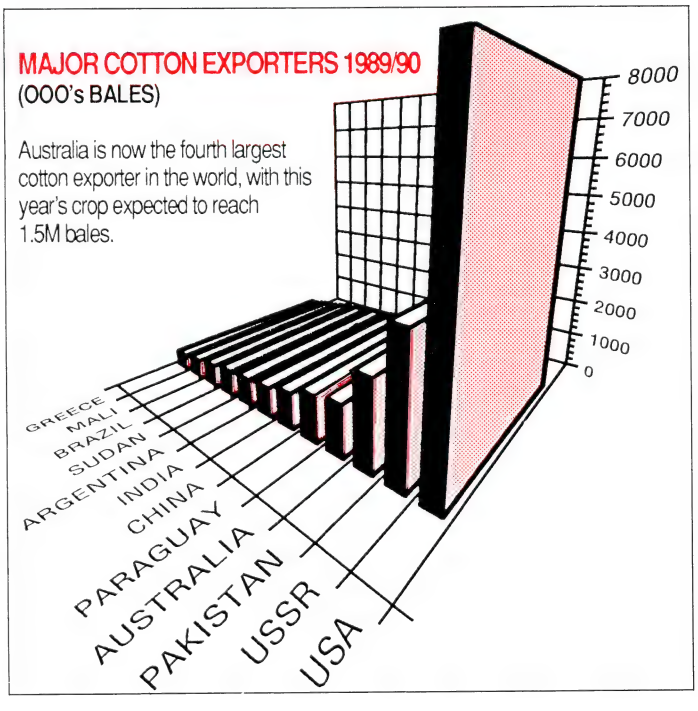
"They are loaded with empty shipping containers by Sydney Haulage at their Botany or St Peters terminals," he said. "The trains vary in length from 340 metres to 500 metres and haul up to 75 six-metre containers."

The Wee Waa train leaves Sydney at 3pm and reaches its destination at 10am the next day. The Moree train leaves Sydney at 11am and arrives at 8am the next day.

As soon as the trains reach their destinations their empty containers are taken from wagons and replaced with loaded containers of export cotton. The process takes from four to six hours. Once loaded, the trains leave and arrive in Sydney the next day. They are unloaded at Port Botany (CTAL/NTAL) and White Bay (Conaust).

Freight Rail's direct service to the ports saves the cotton industry demurrage charges it would face because of long truck queues if road transport were used.

Last season Freight Rail moved about 192,000 tonnes of cotton. This season's figure should be up 20 per cent to about 230,000 tonnes. □



Wildflowers of the outback





Tourist bus and wildflowers at Coal Seam National Park inland from Dongara, Western Australia.

In spring, Western Australia undergoes an amazing transformation. The yellow and browns of summer give way to a show of colour like no other.

The State plays host to more than 8,000 species of flowering plants, 75 different kinds of ferns and five different cycads – a selection unmatched in quantity anywhere in the world.

What do railways and wildflowers have in common?

Westrail, the marketing name for the Western Australian Government Railways Commission, besides operating trains, also has a large fleet of 5-star Mercedes road coaches which complement its first-class passenger trains. These road coaches are also used for tour work and in particular, comprehensive wildflower tours.

The all-new "Outback Wildflowers" tour introduced this year takes clients on a five-day discovery of the unique wildflowers of the marvellous arid outback regions. Travelling through the Wubin area, the tour visits Mount Gibson Station with it's high-tech emu and wildflower farm before heading eastwards to include the fabulous flora and Boyagin Rock Reserve.

The tour overnights in Wubin and York but also travels through many smaller communities of the inland.

The popular northern wildflowers are well covered with the five-day Northern Wildflower Spectacular and the three day Northern Wildflower Preview taking in the spectacular areas around Geraldton and Kalbarri with it's magnificent gorge country.

The six-day Southern Forests and Flowers tour encompasses the vastly different flora of the cooler south-west around Margaret River and Augusta, the majestic Karri forests around Pemberton and historic Albany on the Southern Ocean. Not to be missed is the botanists paradise and wonderful scenery of the Stirling Ranges National Park. For those with less time, the three-day Southern Wildflower Preview provides a great alternative.

The Rainbow/Esperance Coast wildflower tour of six days duration takes visitors further south-east through Albany to the unique country around Esperance. Spectacular coastal scenery in some of the rugged national parks is superb and is complemented by an outstanding wildflower display.

Westrail Wildflower Tours offer extremely good value with prices starting at $340 for a three-day tour. Both adult and pensioner rates are available and the tours are fully inclusive of meals, morning and afternoon teas, private facility motel accommodation and the services of not only a coach captain, but also a botanical guide and a tour hostess.

Westrail Wildflower Tours are marketed throughout Australian Rail Systems and can also be purchased through Western Australian Tourist Centres in all capital cities or contact Westrail 008 099150 or facsimile 09 326 2063.

Western Australia's annual spring show, courtesy of mother nature is by far the biggest of its kind in the world. It has taken countless millions of years to develop, and due to its remote location, it has perhaps earned its new title as "the best kept secret on earth". □



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THE ROAD-RAIL TRUCK

Specialist truck manufacturer Bob Whitehead of Sydney has just completed a trio of rugged 6x4wd heavyweight construction project maintenance vehicles which have a unique combination of capabilities.

They are equally at home using their terrain-conquering 6x4wd capabilities over the hills of rugged mining sites, or gliding along railway lines on which jobs are located.

Guided by retractable railway guide wheels, the 24-tonners can attain 100km/h moving either backwards or forwards (although they usually travel at a more sedate 60km/h on rail).

The vehicles are operated by the CMM company undertaking railway line maintenance work for Hamersley Iron and Steel at Dampier in Western Australia. The sides of one truck's tipping trays are hinged at the bottom so material being unloaded is projected over the sides and further from the truck.

This permits loads to be deposited clear of the railway line sleepers.

There is exceptional deck space on the other vehicles' through-loaders, which have their HIAB cranes mounted lengthways so slewing cylinders do not protrude sideways onto the loading surface.

The driver's cabin door is mounted in front of the cabin so the driver does not have to climb over the load to get in. The through-loaders also feature extensions to the loading platform to enable it to carry railway turnout sections more than 15 metres long.

"An outstanding feature from the driver's point of view is the use of an Air Spring suspension on the front of all the trucks," says manufacturer Bob Whitehead. "The Air Springs give exceptional handling and comfort. My own daughter drove one of the vehicles the 7,000km from Sydney to Dampier and said it was just like driving a car.

"Travelling at 90-100km/h you just didn't feel the heavy jolts of the roughest roads in Australia. Cornering was flat and safe. Air suspension is the ultimate in driver comfort."

Mr Whitehead's projects have ranged from trans-Australia 8wd exploration vehicles to air-suspended intensive care ambulances. Assisted by Air Spring Supply Pty Ltd, he has pioneered new applications for air suspension in heavy vehicles.

The Hamersley vehicles, each of which is powered by an eight-litre Cummins 240hp diesel driving through an Allison MTB653 gearbox with retarder, are the latest in a series of RFW road-railers. Other air-suspended road-railers are being purchased by government authorities including the State Rail Authority in NSW, which will have five built this year.

"The vehicles are Australian-designed, fully manufactured here, and made from 85 per cent local content including 100 per cent use of BHP steel," said Mr Whitehead.

New 90-wagon loading loop



The Camberwell, NSW, open cut loading facility.

A new 90-wagon loading loop, ready for the new T1 three-engine trains, forms part of the recently opened Camberwell open cut coal mining operation at Singleton, New South Wales, which expects to earn about $80 million a year in export income for Australia.

The coal, all of it destined for overseas markets, is loaded at 3,500 tonnes an hour into a large hopper which straddles the rail balloon loop.

Currently three 81-class locomotives are hauling trains of 82 wagons over the 85 kilometres to Newcastle at the annual rate of 1.35 million tonnes. This will change when the T1 three-engine trains come into service on the line.

The Camberwell open cut coal-mining venture is being hailed by State Rail as an Australian high-point in co-operation between a mining company, workers, government, and environmentalists.

The venture is a 50/50 Australian/Japanese consortium of Navidale Pty Ltd (Henry Walker Group), and Toyota Tsusho Mining (Australia) Pty Ltd (40 per cent)/Dia Coal Mining Australia Pty Ltd (10 per cent).

It is a two-pit open-cut operation expected to yield 33 million tonnes over 20 to 25 years. Other coal reserves on the company's 1,735 hectare lease will later be mined underground.

Officially opening the mine NSW Premier, Mr Greiner, said its construction in a little over 13 months reflected the new streamlined approval process for coal leases.

The Department of Minerals and Energy and the Department of Planning had expedited development of the project, he said.

"The partners in the Camberwell mine have set an admirable standard of co-operation and communication with the local community," Mr Greiner said.

"This has assisted in the rapid development of the project and will ensure the mine can blend harmoniously with the local community.

"This mine is the first single-union coal mine in New South Wales.

"This sensible outcome is very much welcomed and has been achieved through co-operation between union management and the proprietors."

The Camberwell company has an environmental monitoring program for air quality, water, noise and vibration to comply with the conditions of its mining lease.

Kevin Craze, Freight Rail's infrastructure manager (coal, grain and minerals), said development and construction of the mine's rail facilities was a fine example of close working co-operation between a private company and State Rail.

It involved State Rail's design, construction and maintenance staff. Signalling and other infrastructure work costing $1.5 million was undertaken by State Rail and paid for by Camberwell. □



Safety awarness is important for Angela Murphy seen here at work on the new Richmond/Riverstone rail electrification project in New South Wales. She is CityRail's first overhead lineswoman and this year gained first place in her graduating class of ten males.

FOR RAIL EMPLOYEES AROUND AUSTRALIA IT'S OCCUPATIONAL HEALTH AND –

SAFETY FIRST

Around Australia the railway systems are heavily committed to occupational health and safety programs which affect management and employees at all levels. Rail has carried dangerous goods in Australia for more than a hundred years.

In more recent times, however, there has been a substantial increase in both the quantity and variety of hazardous substances moved by rail.

For some dangerous materials rail is preferred as a mode of shipment because it can handle volume with greater ease traversing tracts of open country across the continent devoid of traffic congestion.

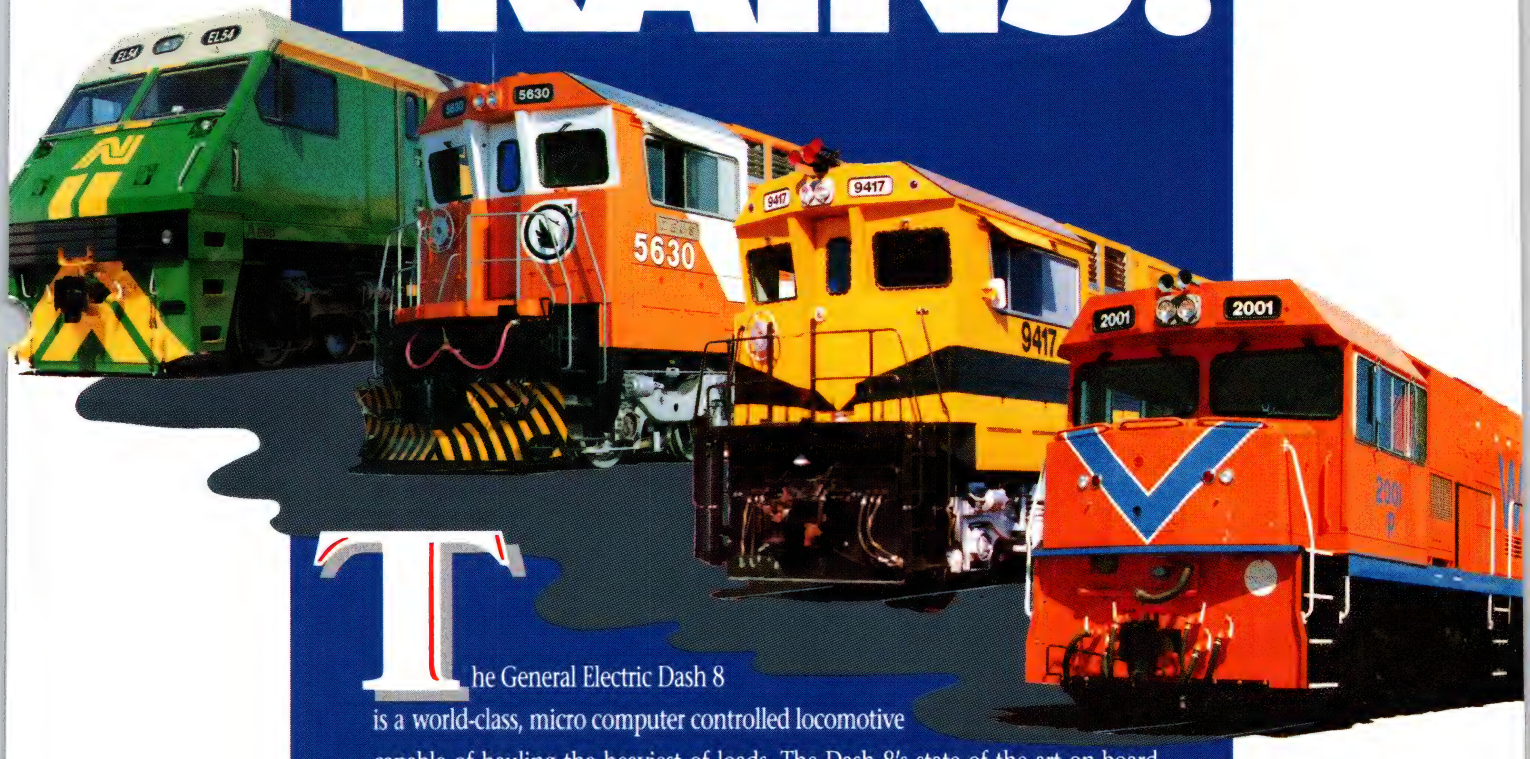
Education of management and staff in the light of new and more complex government safety regulations concerning the transport of hazardous goods is an important aspect of rail operations.

This article summarises some of the latest developments in this area.

One of the most extensive workforce hazard education programs ever undertaken in Western Australia has been completed at Westrail.

Almost 3i00 of Westrail's 5600 staff have been put through one-day dangerous goods awareness

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METAL BOXES WHICH CAN BE LOCKED, LIKE THE ONE SHOWN HERE BY LISA SMITH, ARE BEING INSTALLED IN SUBURBAN TRAIN CREW COMPARTMENTS IN NEW SOUTH WALES TO ENSURE RAIL DETONATORS ARE KEPT UNDER TIGHT SECURITY. IMPROVED ACCOUNTING METHODS HAVE BEEN ADOPTED FOR STAFF USING THE DETONATORS IN THE COURSE OF THEIR WORK. LISA IS A RAILSAFE EDUCATION OFFICER. SHE AND HER COLLEAGUES TAKE THE CITYRAIL SAFETY MESSAGE TO MORE THAN 40,000 SCHOOL STUDENTS EACH YEAR.

courses, and have received comprehensive documents that will allow them to make the right decision in any contact they might have with hazardous substances.

Westrail's Scientific Services Manager, Neil Hammer, says the mass awareness program was the end-point of an evolutionary process.

"In 1982 the Australian Code for the Transport of Dangerous Goods by Road and Rail was adopted. This was essentially a safety code for the whole community. We had to decide what we would do for own own staff," he said.

Sodium cyanide the catalyst

By this time there were beginning to be health and industrial relations implications of two major new Westrail "traffics", monazite and later sodium cyanide. In particular, the transport of the 30 per cent solution of sodium cyanide was the catalyst for Westrail to involve its staff.

The cyanide was planned to be hauled from Kwinana to the Eastern and Northern goldfields, thus traversing thousands of kilometres of the rail network. Haulage of radioactive monazite had gone on since the mid-70s.

"Radioactive" and "cyanide" were terms that, not surprisingly, made some staff very apprehensive.

"We decided on a major training program to inform staff what we are carrying, what the placard diamonds represent, why we marshal trains the way we do and why we segregate certain materials", said Neil Hammer.

The other critical part for Westrail was to train staff in the procedures in the event of accidents.

The threat of incidents involving dangerous goods in the railways is different from a workplace situation. In normal circumstances staff are not occupationally exposed to dangerous goods.

"Our dangerous goods are being transported in a safe way, but we had to identify the potentially unsafe factors – what the goods are, where the goods are on the train, whether they are adequately labelled," Mr Hammer said.

"Then we had to look at the communications system so that operational people know where these goods are. We now have a computerised rollingstock control system with all relevant information about the trains and what they are carrying.

"The aim of the awareness program was to give our people sufficient knowledge to make themselves safe in any event."

The 3100 Westrail people who have received training include every level of operational staff, all the civil engineering field staff, all the communications field staff, and derailment teams.

The poeple who are the vital link in all the handling of dangerous goods are the train controllers. Their awareness is in a different category of importance from everyone else.

They are in direct communication with the trains and with the emergency services.

Another critical element in Westrail's approach was the creation of an in-house dangerous goods committee. The committee has representatives of unions, staff and management. Although it was originally intended to be only a consultative body, it has been successfully involved in operational matters.

Australian National's approach

Australian National Rail (ANR) has adopted the National Safety Council of Australia 5-Star Health and Safety Management System. Initially, the system has been introduced into the Technical Services Division. Surveys have been completed at two major workshops (Port Augusta and Islington). The concrete resleepering operation has been surveyed in Cockburn.

Follow-up visits are scheduled.

The NSCA 5-Star Health and Safety Management System is based on a series of regular performance checks by qualified personnel in five main areas of operation:

- ☐ Working conditions and practices
- ☐ Workplace housekeeping and maintenance
- ☐ Occupational safety and health management
- ☐ Fire and Emergency procedures
- ☐ Safety and health policy, organisation and program control

The system operates nationally on a uniform basis so that it is possible for companies which operate Australia-wide to obtain an overall picture of their occupational safety and health performance.

Under the 5-Star Health and Safety Management System points are awarded in accordance with a comprehensive checklist and performance is assessed against clearly-defined criteria which eliminate subjective judgments. The maximum number of points available is 2,000 for a 5-Star Award.

The system has been designed specifically to suit Australian requirements and offers what NSCA says is the best available means for management to establish, develop and measure its operational performance in occupational safety and health.

In addition, ANR has formed a Standards Committee, with representation from workshops at Islington, Port Augusta and support staff from Keswick.

The objectives of the Standards Committee are to provide comprehensive standards and related procedures for Australian National's manual of Health and Safety Standards. (Taking into account the NSCA 5-Star Health and Safety Management System's 72 Key Elements).

Standard requirements must be achievable and realistic. They must reflect what the organisation can stand in realistic operational and financial terms. They must be designed to assist personnel at all levels of the organisation to be effective in satisfying the audit requirements of the NSCA.

Standards must be brief, concise and simple to read and interpret with logical use of diagrams where possible.

The "Standards Manual" is a working document that all personnel within Australian National will have access to. It enables all employees to measure themselves and the organisation across the 72 key elements of occupational health and safety.

The PTC in Victoria

What appeared to be a high number of manual handling injuries among rail employees in Victoria was a major concern to workers, their unions and their employer the Public Transport Corporation. Neither employer nor workers at the time had any organised response to deal with manual handling hazards.

The advent of the Manual Handling Regulations and Code of Practice placed a responsibility on the PTC and all employers to ensure safe manual handling practices. The PTC and unions got together and decided to use the framework offered by the legislation as a means of responding to their high incidence of manual handling injuries.

A manual handling program was devised by the Public Transport Corporation in conjunction with the rail group of unions. The program paired supervisors and elected health and safety representatives who together participated in:

- ☐ A two and a half day training workshop which addresses the manual handling regulations and code with actual examples from the workplace.
- ☐ A site visit by each pair to their workplace to identify six manual handling risks.
- ☐ A group discussion where one priority risk is discussed from each pair. The worked solution is then trialled for six weeks after which it is reviewed in a half-day workshop that also assists in planning future work.

Many solutions have been produced and hazards eliminated.

A key factor in the program's success has been the improved communication and consultation between supervisors and elected health and safety representatives, which has ensured that solutions are acted upon. Substantial savings have been achieved with reduced claims for manual handling injuries.

State Rail in NSW

In the State of New South Wales, two new major projects in State Rail's high profile Safeworking will soon have a direct effect on more than 55 per cent of employees in CityRail, Freight Rail and Countrylink.

TRACKS

WITH LARGEF

AN's



RAIL FREIGHT SERVICES AND FACILITIES AROUND AUSTRALIA ARE MODERNISING AND EXPANDING TO MEET THE GROWING NEEDS OF INDUSTRY AND THE BUSINESS COMMUNITY. THE FAST AND EFFICIENT DOOR-TO-DOOR SERVICES OFFERED BY RAIL ARE SET TO SECURE A LARGER SHARE OF THE FREIGHT MARKET AS PLANNERS LOOK DECADES AHEAD TOWARDS THE FUTURE OF RAIL FREIGHT ACROSS THE CONTINENT.

FROM PREVIOUS PAGE

An estimated 15,000 employees (from a total of 27,000) are involved in Safeworking, according to General Manager Safeworking, Barry Camage.

All these employees, in the front line of railway operations, will benefit from the new projects – the rewriting of all safeworking rules and regulations into plain English, and the important new training accreditation programs for safeworking employees.

Employees involved include train controllers, station and train staff, track site work gangs, shunters, signallers and inspectors.

Safeworking employees schedule trains, drive them, operate points and signals, repair the track, cope with all sorts of emergencies, and do everything possible to make sure trains operate safely and on time.

The task of rewriting safeworking rules and regulations has been a mammoth project for Rosane Dunn and a specially formed team.

The new manuals will be available in December.

New safeworking refresher training programs have been designed, and safeworking will be regularly re-accredited.

Safeworking comes under the direct control of State Rail's Chief Operating Officer, Vince Graham, and its umbrella covers all State Rail operations. The Manager Safeworking Standards, Jim McFarlane, says the new projects will provide further help for employees preventing accidents and mishaps.

"Safeworking regulations, developed historically as railways began to expand, help guarantee safe running of trains, and guard against human error," he said. "All safeworking equipment is repaired to be 'fail safe'; that is, if it fails, it must stop the trains from running into dangerous situations.

"We are determined to make sure safeworking employees are well trained, and their skills are maintained," he added. □

TRAINS THEY SHIFT MORE FREIGHT FASTER

huge straddle cranes

The $20 million Islington Freight Centre upgrade program for Australian National has reached a new milestone with the introduction of two new Mijack straddle cranes. The cranes, worth $4.5 million, are the latest development in Islington's bid to shift more freight faster to cope with larger trains and a strong rise in container traffic – 30 per cent in 1989/90.

The straddle cranes, which begin shifting container traffic in the intermodal yard at the end of July, move along bitumen runways on two-metre high tyres capable of rotating 180 degrees to allow for swift relocation.

Spanning 21 metres, they have a lifting capacity of 45 tonnes and complement the centre's award-winning piggypacker mobile cranes, reaffirming AN's position in Australia as a leader in the installation of state-of-the-art materials handling technology.

The first delivery of USA components for the straddle cranes arrived at the centre in six containers by superfreighter from Sydney in March. South Australian company Perry Engineering also constructed straddle crane components, including columns and cross beams, at Mile End.

This was a first for USA engineering company, Mijack, which usually provides a 100 per cent product package with all component construction work done within America.

Islington Freight Centre terminal manager John Schell said: "Mijack had the confidence and faith in the ability of South Australian engineering to allocate some of the component construction work to industry within the State."

The current development is worth almost $10 million and includes the building and installation of the new straddle cranes, $4 million worth of earthworks and paving and $1.3 million in trackwork, all on target for completion by mid-August.

"The $10 million project includes considerable input by both Australian and South Australian technology. Mijack's agent is NSW-based company Combined Lifting Equipment and SA company Stockport Civil is heavily involved in the earthworks, paving and associated drainage, cabling and bitumen runways for the straddle cranes.

"Considering the recession doom and gloom we are confronted with this project is a real boost for both South Australia and Australia," John said.

The ongoing upgrade program, targeted for completion in the mid-90s, also includes yard extensions and the introduction of new southern rail and road access. The new three-lane southern road access opened in November 1990.

A computer controlled weighbridge and associated gatehouses give Islington the ability to lift throughput at the gate sixfold. Electronic sensors help the truck driver to centre his vehicle on the weighbridge and freight is processed through the Container Reservation and Inventory System (CRIS) computer network.

A new 1.3km shunt track adjacent to the shunt main was opened in December 1989. Catering for superfreighter arrivals and departures, it can accommodate 70 19.2 metre wagons.

The dual gauge shunt track complements shunt main operations, allowing for the assembly of long trains without obstructing other shunting activities.

A new 800 metre dual gauge southern rail feed track allows access to the intermodal yard from both the standard gauge mainline and the metropolitan broad gauge line running along the centre's eastern boundary.

The link between broad and standard gauge mainline operations means shunting can be carried out from either end of the intermodal yard, streamlining the loading and unloading of Melbourne superfreighters.

Future development at Islington includes three kilometres of new trackwork and associated paving on the western side of the intermodal yard, extending two 800 metre tracks for container handling into four 1100 metre tracks. □

SOUTH DYNON, THE MAJOR RAIL FREIGHT DEPOT IN THE SOUTH IS PLANNING FOR A –

Four-times rise in container traffic

V/Line's main freight terminal in Melbourne, the South Dynon Intermodal Freight Terminal, is being transformed into a highly efficient, computer-controlled container terminal.

Growth in containers and V/Line's Superfreighter traffic is such that modernisation and extension of the existing container depot at South Dynon is vital.

The $28 million project will develop in stages over a 10-year period.

Following site clearance, a massive upgrading of the existing pavement has taken place, replacing bitumen and gravel with Amatek Anchorlox concrete segmental pavers, chosen for a hard, durable, low maintenance surface.

Terminal manager Bob Glaubitz said installation of the paving caused minimum disruption to freight movements. The paved area – now is twice the previous pavement size.

"The old areas were potholed gravel and at times mud. There were a lot of flood prone areas in the old bitumen yards, too," he said.

The area is one of the largest covered by Amatek Anchorlok pavers in Victoria – 24,100 square metres, mechanically laid.

Amatek installed the paving for V/Line contractors Alto Constructions, which is responsible for earthworks, drainage and upgrading rail link areas. The area now paved in heavy-duty segmental pavers is the basis for further construction and the provision of modern freight handling equipment.

Trackwork will involve dual gauging of existing tracks through the shed site and extending the Superfreighter area for handling more and longer trains. A new terminal control will be equipped with Container Handling Inventory Control (CHICS), a computer-based system to efficiently regulate container movement at South Dynon.

By the year 2000, the terminal is expected to handle around 400,000 containers a year – four times the number handled currently.

Anchorlok pavers were installed by machine in clusters of one square metre on a compacted base course and sand bedding. This allowed a durable pavement to be laid quickly with re-use of the surface immediately without further treatments or waiting periods.

Laying rates of up to 850 square metres per day were achieved during the project using two machines. □

The upgraded V/Line terminal in Melbourne, newly-paved for heavy-duty use.



European agreement on combined transport corridors

A landmark agreement drawn up under the auspices of the United Nations Economic Commission for Europe now encompasses the main international combined transport corridors plus associated installations.

It has been open for signature by EC countries in Geneva since 1 April 1991.

When drafting the agreement, the UN authorities had several objectives in view:

☐ Development of a legal framework within which international combined transport services, and more particularly rail/road intermodal transport could become competitive.

☐ Adoption of measures to make international combined transport more attractive to customers.

☐ Increasing the use of through trains for international combined transport.

☐ Improvement of international coordination and cooperation with proper planning and clearly defined priorities for launching a homogeneous European combined-transport network.

To meet these objectives, the agreement:

☐ Pinpoints the European rail corridors used for international combined transport.

☐ Identifies all terminals, frontier-crossing points, train-ferry links, and other major infrastructure catering for services integrated into the international combined transport chain.

☐ Defines internationally-valid standards for these lines and related combined-transport installations.

☐ Specifies international performance criteria for trains, installations and equipment used in combined transport.

World high speed roundup

High speed rail travel has captured the imagination of people in many countries, including Australia where the private consortium's proposal to link Sydney and Melbourne with a very fast train (VFT) is being examined by a Federal Government committee.

It is just 27 years since Japan introduced its Shinkansen bullet train between Tokyo and Osaka to serve the needs of high-density population. In the interim, major developments have taken place elsewhere.

The European Commission recently adopted a masterplan for a European high speed train network. Covering the period from now to the year 2010, the plan involves construction of 9,000 km of new track and 15,000 km of refurbished existing lines to take high speed trains.

The French, Germans, Italians and Spanish have all endorsed high speed rail projects.

Spain's first high speed railway is now under construction on a 475 km route between Madrid and Seville. With an operating speed of 300 km/h, services will begin in time for Expo '92 in Seville. A second line will run from Madrid to Barcelona and the French frontier.

Germany's State-owned railway system has formally introduced its new InterCity Express high speed train services. More than two dozen ICE trains began a regular 270 km/h service linking Hamburg, Frankfurt, Stuttgart, Munich and cities in between.

German Federal Railways have also announced plans for a second generation ICE able to run at 350 km/h, the same speed proposed for Australia's VFT.

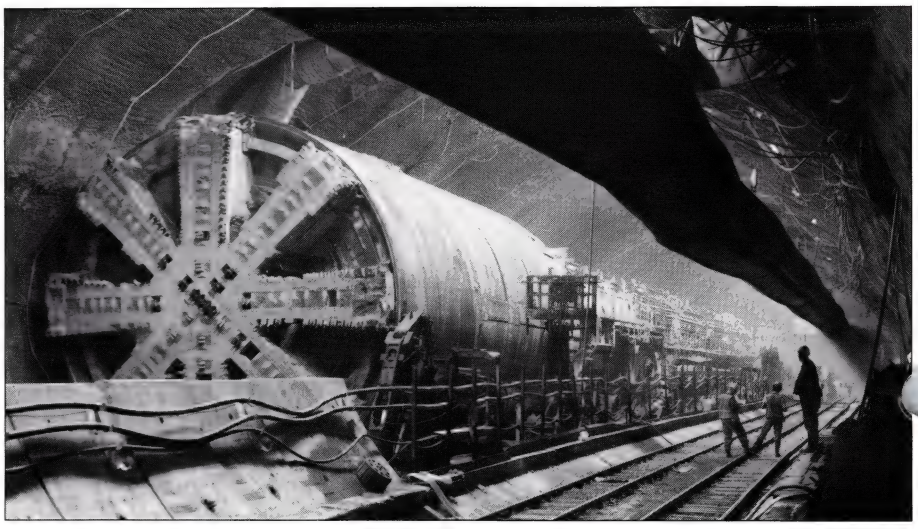
On the other side of the Atlantic the Texas High Speed Rail Authority has selected a $7 billion bid by a consortium that includes CBC Alsthom of France (builders of the TGV) to build a 800 km high speed line linking Dallas, Houston and San Antonio.

In Canada, six major banks have united with the GEC Alsthom and the Canadian manufacturer Bombardier to form a consortium to examine the feasibility of a very fast train between Montreal and Toronto. The projected cost of this study will between 30 and 50 million Canadian dollars.

Across the Pacific construction of Taiwan's first high speed rail system is expected to begin within a few months. The project will result in a cross island rail system from Taipei in the north to Kaohsiung in the south, connecting through Taichung in the central region.

Target date for initial operations of the high speed line between Seoul and Pusan, Korea is 1998. The 410 km line will be designed for 350 km/h, with a commercial speed of 300 km/h. The government estimates total project cost at $12.5 billion. The line and stations will be completely new structures and the track dedicated to high speed operations only.

Tunnel will speed rail freight



A rare view of the tunnel boring machine used to complete the under-sea link between Britain and France. The tungsten-carbide teeth of the cutting head can bite their way through the chalk marl at more than 1000 metres a month.

Freight between the United Kingdom and other European countries will be speeded by the new Channel Tunnel and a giant multi-million dollar railfreight centre to be established on an 81-hectare site at Normanton.

Described as Britain's first Channel Tunnel railfreight village, it will employ up to 4,000 people and offer fast, direct export/import services to Europe.

Door-to-door services will provide next-day deliveries while a typical terminal to terminal movement from the northern England railfreight village to Milan in Italy will take just 36 hours.

The new centre is planned by Britain's Railfreight Distribution and AMEC Regeneration companies. In its early years of operation, it is expected to handle some 400,000 tonnes of freight a year with ample room for growth as the actual capacity of the centre will be more than double that figure.

The freight village will be well located to service the busines communities of several cities and many towns in the Yorkshire and Humberside regions of the UK. It will offer secure storage and a host of support facilities that include manufacturing, breakbulk, distribution and warehousing. Two gantry cranes and a reach stacker will be used to smooth the transfer of unitised cargo between rail and road.

The area is already served by an existing railfreight distribution terminal at Stourton in the nearby city of Leeds, and this will continue to deal with domestic and deepsea cargo while the new terminal will concentrate on traffic that will be routed from 1993 via the tunnel.

For passenger traffic a new international railway terminal is being built at Waterloo in London. From 1993, it will handle five million passengers a year travelling direct to Paris and Brussels through the tunnel.

The new terminal is being built as a separate terminal within the existing Waterloo station that handles much of London's commuter traffic as well as longer distance trains serving towns and cities throughout southern England.

The new London gateway to Europe will be housed beneath a curved glass roof and contain five platforms, each 400 metres long. From here, a fleet of new streamlined trains will leave every hour for both Paris and Brussels, with extra services at peak periods.

Journey time to the centre of Paris will be three hours with Brussels being reached in three hours, 11 minutes. The latter will be reduced to two hours, 40 minutes in 1995 once further route improvements have been carried out in Belgium.

The timescale of the Channel Tunnel building project means that Waterloo International will have to be completed in less than two and a half years.

The first railway station at Waterloo was opened in July 1848 when it comprised three platforms and was served by seven trains in and out each day. By 1885 there were 18 platforms handling as many as 500 trains a day, and in the heyday of the great Transatlantic liners, services between Waterloo and Southampton connected with Cunard's Queen Mary and Queen Elizabeth liners.

The station on a typical weekday now handles some 1,500 trains and 200,000 passengers. About 60 million people travel to and from Waterloo each year.

RAIL ADVISORY COUNCIL FORMED

Major figures in the Australian rail industry and users of railway services have met in Canberra to form the Australian Rail Industry Advisory Council (ARIAC).

The Council will have the role of advising the Federal Minister for Land Transport, Bob Brown, on rail reform.

The meeting included senior people drawn from BHP; TNT; Railex; the Victorian Public Transport Corporation; the Australian Transport Officers Federation; the Australian Railways Union; and the Australian Federated Union of Locomotive Enginemen.

It was chaired by former South Australian Minister for Transport, Gavin Keneally, who has accepted appointment as chairman of the ARIAC.

"The Council aims to play an important role in reforming the rail system to ensure that it is operated as a business, is responsive to user needs, requires fewer subsidies, is safe and plays its part in improving the economy," Mr Brown said.

FREIGHT RAIL'S 15-YEAR COAL CONTRACT

Freight Rail in New South Wales and Ulan Coal Mines Limited have signed a 15-year contract for the transport of one million tonnes per annum of coal from Ulan (near Mudgee) to Eraring Power Station.

The contract follows recent moves by the Electricity Commission of NSW to improve competitiveness in the supply of coal to power stations. During 1990 Elcom sought tenders for the supply of coal to a number of its power stations with the expectation that both its own mines together with mines owned by the private sector would compete for the huge amount of business available.

As soon as tenders were called Freight Rail commenced negotiations with a number of private coal companies.

The transport task will require about six 42-wagon train loads each week. Each train will carry 3200 tonnes of coal and will be unloaded within an hour of arrival at the coal receival facilities.

LAND FREIGHT POLICY STUDY

A government working party is being formed to provide advice in relation to competitive aspects of road/rail freight transport in Western Australia. The working party is to include representatives from the Department of Transport, Westrail and the Minister's Office and is to report to the Transport Minister, Pam Beggs by the end of October 1991.

Terms of reference include:

☐ Examine and report on the corporate objectives and mission of Westrail and, in particular, to identify the major initiatives which Westrail is pursuing in respect of the various components of its freight business

Chairman will be Mr Alan Hubbard from the Department of Transport.

MAJOR CONFERENCE ON RAIL TRANSPORT REFORM

Federal Minister for Land Transport, Bob Brown, will deliver the opening address entitled "The Rail Transport Industry – Can it Respond to the Forces of Change?" at a two-day conference on rail transport reform being held at the Hilton International Hotel, Sydney, on 29 and 30 August 1991.

The conference is wide ranging in its coverage of topical rail transport issues and brings together a mix of government, trade union, business and academic viewpoints.

Among the speakers are:

☐ Ross Sayers, chief executive, State Rail Authority, NSW; Ian Stoney, Public Transport Corporation, Victoria; Dr Jim Gill, Commissioner for Railways, Western Australia; Chris Thorpe, acting first assistant secretary, land transport policy division, Department of Land Transport.

☐ Peter Rocke, director, Mayne Nickless Ltd; Meredith Hellicar, executive director, NSW Coal Association; Jim Lewis, general manager, BHP Transport Ltd; Ron Knapp, associate director, Australian Mining Industry Council; Philip Norman, senior economist, Business Council of Australia; Chris Thomas, managing director, Amskan Ltd; Mark Smith, managing director, Centre Lease Corporation.

☐ Roger Jowett, national secretary, Australian Railway Union; Dr Philip Laird, University of Wollongong; Maurice Barklay, commercial director, Australian Road Transport Federation; Alan Castleman, chief executive, Very Fast Train (VFT) Project; David Hawker, Federal Shadow Minister for Transport; Dr Peter Barnard, Meat and Livestock Corporation.

Topics to be addressed by these speakers cover subjects such as: Giving railways a more commercial orientation in financing and capital investment; improving the productivity and efficiency of passenger services; achieving competition within the railway industry; the Industry Commission Rail Transport draft report; formation of a National Rail Freight Corporation; the change of direction in Queensland towards more commercially-driven strategies; the reform of rail in New South Wales.

The conference is being organised by AIC Conferences, 17 Arthur Street, Surry Hills, NSW 2010. Enquiries to Sarah Lance, telephone (02) 699 8522, Fax (02) 698 1832.



Claisebrook Westrail depot and facilities on opening day.

A $7.5 million new railcar depot featuring a high-tech car washing plant, four jacking pits and a unique building design, has been brought into operation at Claisebrook, a suburb of Perth.

It will be used to maintain the new electric railcars introduced to the urban transport system.

Westrail Commissioner, Dr Jim Gill, says the electric rail service needs first class facilities for maintenance, servicing and cleaning.

"What we see here is the culmination of the planning and construction of those facilities," he said. "They are a far cry from the conditions endured by staff in the old diesel electric shed next door."

Some of the most impressive features of the new railcar depot are the four jacking pits which could lift a 48 metre long, two-car set weighing 88 tonnes.

The jacks are supported by a 50-tonne concrete foundation.

The car wash plant and internal car cleaning facility have some of the most up-to-date equipment in the world.

The wash plant is activated by an approaching train. Each of the 21 sets of cars will pass through the cleaning facilities each day.

Transport Minister, Pam Beggs, officially opened the new railcar depot at Claisebrook before an enthusiastic group of parliamentarians, unionists, contractors and Westrail and Transperth staff.

"Efficient, high quality suburban transport is an integral part of improving the quality of life for Western Australians," she said.

The Claisebrook depot is also functioning as an operating base for the new EMU-class railcars which came into service with the recent electrification of the Perth suburban rail system.

MANAGEMENT KEY TO LONG RAIL LIFE

Successful rail management will prolong the useful life of track carrying passenger and freight services at speeds to 160km/h. The integrity of rail also assists in the assurance of safety for train users.

With these factors in mind two NSW State Rail officials recently reported on their overseas study tour.

As part of the continual updating procedure and striving for the best, Mr R. Gibbeson, Rail Inspection Services (Freight Rail) and Mr M. Croucher, Regional Civil Engineer, West (CityRail), recently returned from a study tour of selective North American and European railways examining rail management systems, track component performance, track machinery and component technologies.

Items of interest in their report include: internal rail defect detection methods using rail mounted vehicles and hand-held or manual-propelled units; defect removal specification; contract documentation; rail renewal and grinding policies; turnout performance under 35 tonne axle loads; small machinery for local fettling gangs.

Initiatives to be pursued include:

- ☐ Incorporation of contractual agreements from North American Railways in the future rail inspection contract for State Rail
- ☐ Introduction of a totally computerised rail defect reporting system
- ☐ Review of a rail defect removal policy
- ☐ Purchase of a hand-propelled light-weight ultrasonic inspection trolley to test short sections missed in the main test cycle
- ☐ Increase in rail grinding performance

Retention within the existing policy of the present rail defect sizing codes, rail testing frequencies, hand verification of all rail defects and the use of hy-rail type vehicles were reinforced by the tour.

REWARD FOR INNOVATION

Entries are being received for the 1991 Australian Transport Industry Award, which is made each year by The Chartered Institute of Transport in Australia for outstanding and innovative contributions to the improvement of Australian Transport.

The award can be made to an individual or organisation for a technical invention, process or system; the new application of an existing process; a document outlining a practical concept, industry policy or administrative activity; or an outstanding contribution to the theory and understanding of the function of transport.

Further details may be obtained from Mr. Ken Duncan, Executive Director, The Chartered Institute of Transport, PO Box Q398, Queen Victoria Post Office, Sydney, NSW 2000. Telephone: (02) 264 6413, Fax: (02) 267 1682. Entries close 31 July 1991.

SHIPS LOSE TO RAIL

During the past 18 months Freight Rail in New South Wales, in conjunction with Australia National Rail has been quietly working to secure a number of trial shipments of coal to Western Mining Corporation in Hampton, Western Australia.

This business has been won in the face of direct competition from the coastal shipping industry.

To date approximately 10,000 tonnes have been transported from Pelton and Wallerwang in NSW. Most of the shipments have originated in the Western Region and Freight Rail's regional general manager west, Ian Hill, said it was pleasing to see opportunities such as this adding to job security in the region.

QR'S COURSE FOR RAIL ENGINEERS

Queensland Rail will conduct another training course in Railway Civil Engineering from 11 August to 11 September 1991. This follows the success of the course for junior civil engineers in August and September, 1990 – a first for Australia.

The course program this year is designed to give engineers both theoretical and practical grounding in the specialised field of railway engineering. It is also invaluable for more mature engineers wanting to upgrade their railway knowledge.

The 32-day course has four modules. ☐ Maintenance procedures; ☐ Infrastructure management; ☐ Track design and; ☐ Bridge/Earthworks design and construction.

Candidates will visit the Brisbane and Sydney suburban systems, Central Queensland heavy haul lines, and associated industries and manufacturers. The course has been accredited by the Institute of Engineers Australia as part of the 150 hours on continuing education required for registration.

Significant overseas representation at the 1991 course is expected. The venue will be Cedar Lake in the hinterland of Queensland's Gold Coast. QR's General Manager Engineering welcomes any enquiries on telephone (07) 235 1574.

LOAD SHIFTING DETECTION

A load shifting detection system has passed extensive testing by Westrail and will soon be in full use on the track between Northam and Kalgoorlie.

It is expected to save Westrail thousands of dollars in damaged signals, track and equipment.

The detector consists of a six-metre post at each side of the track. The posts have outriggers at the top holding the equipment to send infrared beams to receivers on the ground.

Anything outside the normal width of a train will break one or both infrared beams and set off a visual and audible alarm at the control centre. The train will then have to stop at the next station for inspection.

Westrail signal engineer Peter Wilkinson said the system would avoid many situations where Westrail equipment could be destroyed because of over-width loads.

$8.8 MILLION BRIDGE CONTRACT

An $8.8 million contract to build the freeway and railway bridges over Vincent Street, Powis Street and Scarborough Beach Road, Perth, has been awarded to Leighton Contractors, which submitted the lowest of seven tenders.

The contract, scheduled for completion in April 1992, forms part of the Westrail-Main Roads Department project for the widening of the Mitchell Freeway and the construction of the Northern Suburbs Railway.



Load-shifting detection system in Grass Valley, WA.

AWARDS FOR STEEL BRIDGE DESIGN

Awards worth $10,000 have been announced for Australian steel bridge design and construction. The Australian Institute of Steel Construction and the James F Lincoln Arc Welding Foundation are jointly sponsoring the awards.

The purpose of the awards is threefold:

☐ To acknowledge the internationally high standard of arc welded steel bridges designed and constructed in Australia

☐ To promote the time and cost benefits to the community and specifiers of arc welded steel bridges

☐ To promote safe, environmentally suitable bridges which enhance Australia's economic and social structures.

Entries will be judged on their ingenuity and innovation, practicality, results achieved or expected, and clear and effective description. Entries on bridges and spans up to 40 metres, completed after 1 January 1989, are due by November 1991 and awards presented at the 1992 Steel Convention in September. First prize is worth $5,000, second prize $2,000 and there are six merit awards worth $500 each.

Enquiries: Michael Charlton, Australian Institute of Steel Construction, (02) 929 6666.



SIGNING AT SYDNEY'S CENTRAL

Australia's nationwide rail passenger reservations system, 'TRAINS', took another step forward in May.

Qadrant International Pty Ltd are developing the 'TRAINS' software for Australia's railways, and will use the services of Qantek (Qantas Information Technology Limited) to provide speedy computer communication link between rail reservation centres.

General managers of Qadrant, André Fournier (left) and of Qantek, Barry Grisdale (right) used number one platform at Sydney's Central Station as a venue for signing their agreement.

Two 'TRAINS' Project Directors – Rob McNair (Qadrant) and Michael Schrader (ROA), and the SRANSW "Brisbane XPT" look on from the background.

The first stage of the 'TRAINS' System, providing a reservation service for all of Australia, is due to come "on stream" in a phased approach from October 1991.

DEMAND MANAGEMENT OF ASSETS CONFERENCE

A conference entitled *Demand Management of Assets* will be held at the Convention Centre in Adelaide on 23, 24 and 25 September 1991.

The conference is being convened by the National Committee of Railway Engineering of the Institution of Engineers Australia. It is expected that the subjects to be discussed will be of wide interest particularly as railway engineering embraces a multitude of disciplines.

The conference will be run over three days with two parallel streams over six of the ten sessions in which time 50 papers are expected to be presented.

It will cover aspects of asset management such as whole of life costing, replacement v. maintenance, design optimisation, financial and engineering modelling, performance measurement, improving utilisation and remanufacture.

Following the conference a one-day course (26 September) will be held entitled *Equipment Maintenance Replacement and Reliability.* The course presenter will be Andrew Jardine who graduated from the University of Strathclyde. He has extensive experience in England and Canada. The course is oriented to be of interest to engineers in all industries.

Registration brochures and further information are available from: The Conference Manager, Conference on Railway Engineering 1991, The Institution of Engineers Australia, 11 National Circuit, Barton ACT 2600, Canberra.

This conference has been well supported by corporate sponsors enabling the basic cost (for non-members of the Institution) to be $345 for the three days. The one-day course will cost $300 (including materials, books and meals) and may be attended without participating in the full conference.

On 26 and 27 September 1991, a conference is being organised by the Australian Road Research Board entitled *Improving Safety of Railway Level Crossings* and will be held at the same venue. Further details are available from ARRB PO Box 156, Nunawading, Victoria 3131.

The two conferences have been co-ordinated to allow interested parties to conveniently attend both.

TRAIN SIGNAL UPGRADE

A number of detailed reviews of Melbourne's suburban train signalling system is providing valuable information to assist in upgrading the network. Major works have been underway for some months and will be boosted by the provision of the latest details.

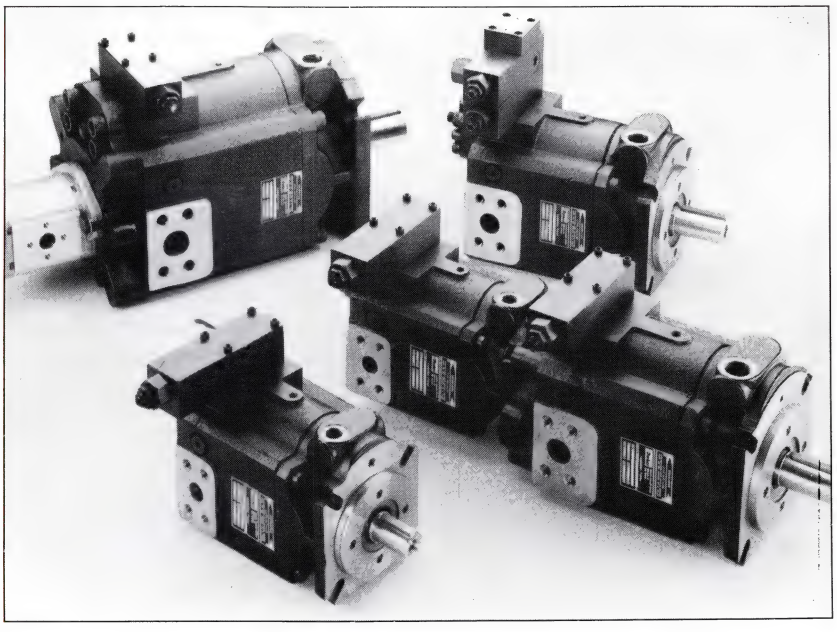
Work costing $5 million has already started on signal boxes at Clifton Hill and work is about to begin at South Kensington. An additional $4 million is being spent on replacing and searching old signal cables.

The rehabilitation program will radically improve the reliability and performance of the signals while reducing maintenance costs. The Victorian Government has made a commitment to provide $100 million for improving the signalling system during the next ten years.

Last year, the Public Transport Corporation commissioned a report by Connell Wagner to further identify and priortise the rehabilitation program.

NEW PRODUCTS & PROCESSES

Information and photographs about new products and services available from Australian companies serving the rail transport industry, particularly those relating to new technological developments, should be forwarded to the Editor, Network, GPO Box 2501V, Melbourne 3001.



Heavy ductile iron housing lowers noise levels for this new series of pumps.

New pumps reduce noise

A new series of axial piston pumps has been released by Parker Hannifin combining features which give high power and precision control while saving energy and reducing workplace noise hazards.

The PV series variable displacement pumps – available in capacities from 16-500cc/rev – have large servo pistons for fast response, less shock, better performance and longer component life.

The pumps, operating on 350 bar (5000psi) continuous working pressure, are suitable for a variety of industrial applications on hydraulic power units in open loops. These range from production automation, robotic drives and metal fabrication through to mining, construction, agriculture and transport.

The pumps' servo pressure control provides state-of-the-art control to achieve infinitely adjustable pressures. These marry electronics to hydraulics to achieve precise control and increase design flexibility.

The PV series' two-piece design is easily repairable. All pumps are pre-tested to Parker Hannifin's specifications to assure proper performance at start-up.

For further information, please contact Mr Mike Zahra, Product Manager, Hydraulics, Parker Hannifin (Australia) Pty Ltd, 9 Carrington Rod, Castle Hill, NSW 2154. Telephone (02) 634 7777. Fax (02) 680 4445.

Technology for pallet repairs

A modern new pallet sorting and repair depot operated in Townsville occupies 8,000 square metres with rail access, and is in an industrial area bordering on bushland.

A forklift transfers pallets from trucks in the yard to the sortation yard, where the correct type of repair is identified. Damaged pallets are transferred to repair stations, while a conveyor system carries the other pallets to an all-weather fully enclosed spray-painting booth.

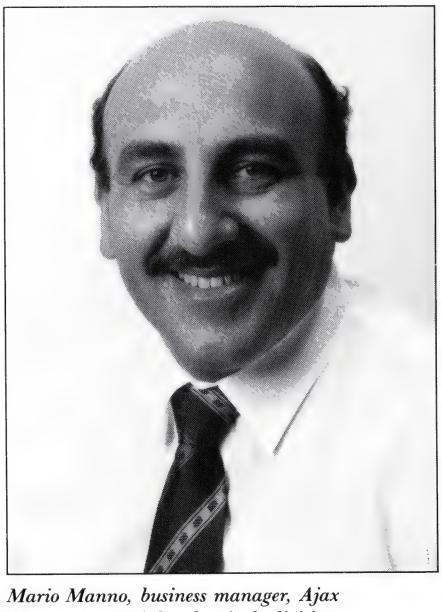
Enquiries: Glenn Bunney, Marketing Manager, Chep Australia, 70-76 Alexander Street, Crows Nest NSW 2065. Telephone (02) 906 0300 Facsimile (02) 906 2404.

Ajax's free Turco hotline

A new national 008 tech-help hotline to advise customers with locomotives and rail rolling stock has been established for Turco products by Ajax, their Australian manufacturer.

The new free phone service is part of a drive by the specialty chemicals division of Ajax Chemicals, to increase Turco's market share.

Mr Mario Manno, the division's newly appointed business manager, says: "If you want to know where to get a Turco product, need advice on which one to use, phone 008 022 200 free of charge anytime between 8.30 in the morning and 5 o'clock in the afternoon (EST) and we'll solve your problem.



Mario Manno, business manager, Ajax Chemicals, specialty chemicals division.

"For example, people are having trouble disposing of carbon removers which contain phenols and chlorinated hydrocarbons. We can advise them about products that just don't contain these chemicals."

The product ranges involved are used extensively as solvents, sanitisers and cleansers in the maintenance of locomotives and rolling stock.

Enquiries: Mario Manno (Ajax) (02) 682 1400 or The Ajax-Hotline 008 022 200.



Western Australia's Deputy Premier Ian Taylor (right) with Raffles Paints Australia Pty Ltd general manager, Mike Falconer, and accreditation certificate.

WA paint company accreditation

Raffles Paints Australia Pty Ltd, a WA-owned paint manufacturer, has received accreditation to the highest international quality standard. It is the only WA paint manufacturer to become a quality endorsed company for production and installation through Standards Australia.

The International ISO9002 quality standard through Australian standard AS3902 is only granted to companies which can demonstrate that the management and products are of a sufficiently high continuous standard to satisfy a rigid set of specifications which guarantee product quality and consistency. Accreditation can only be achieved after a rigorous third party independent audit by an officially authorised organisation and accreditation confirms that Raffles Paints is producing products of the highest quality and consistency.

Raffles Paints has also won the approval of the Government Paint Committee (GPC) which provides conditions for products to be used on government contracts, and the technical laboratory at the company's Welshpool complex is registered by the National Authority for Testing in Australia (NATA).

Enquiries: Ron Berryman, telephone (09) 321 9090.

LRV gains go world wide

More than half the 130 new Light Rail Vehicles for the Victorian Public Transport Corporation have been commissioned into service. Due to the unusual and difficult weather conditions for which Melbourne is famous, updates and modifications have been made to the software controlling the vehicles.

The modifications designed here are also implemented in other countries, such as Germany and Mexico, to ensure high quality standards can be maintained worldwide.

The LRV's are also designed to save electricity and thus benefit the environment. When a vehicle slows down, the energy released generates electricity instead of heat. A chopper, which controls the power supplied to the tram driving motors, feeds this electricity back into the overhead lines. It can then be used by other trams running on the same overhead lines or in the same area.

The chopper is controlled by a SIBAS 16 Traction Control Unit (TCU) from Siemens which constantly monitors the operating functions of the traction system. Any predetermined malfunction is detected and recorded for later use by maintenance personnel. Access to this information reduces fault identification and rectification time, thus lowering vehicle maintenance costs.

Safety is another important factor in LRV design. Once it reaches the maximum speed of 85km/h, the brakes are automatically applied to slow the vehicle. This is also controlled by the Siemens TCU.

Siemens has supplied 70 TCUs, plus power contactors and circuit breakers to Tuen Mun KCRC in Hong Kong for their light rail system.

Enquiries: Franz Kertapati, Siemens Ltd, 544 Church Street Richmond Vic 3121.
Telephone (03) 420 7207

Liquid Controls make sales gains

Chicago manufacturer, Liquid Controls, continued to increase its penetration of the Australian market with its LC meters last year when Australia became its fifth largest international market.

Emco Wheaton Australia, exclusive distributors of the unique LC meters, climbed to the fifth position, past Japan, Sweden and others. Ahead was Canada, Britain, South Korea and France.

Because Liquid Controls devotes its efforts solely to liquid measuring and controlling equipment, the company is able to meet most customer needs with its positive displacement meters that offer extreme accuracy in measurement with the lowest maintenance costs.

LC meter's unique design has no material-to-material contact within the measuring chamber. True rotary motion, close clearances between mating surfaces and low differential combine to establish a capillary seal which virtually eliminates slippage or inaccuracy.

Meters and accessories are available in sizes with flow rates up to 4,700 L/m and working pressures up to 10,000 kPa metering liquids with viscosities to 1,000,000 SSU.

Nineteen possible materials of construction classes including all aluminium, all iron, all 316 stainless steel, or combinations are available.

Enquiries: John Beard, Emco Wheaton Australia.
Telephone (03) 486 2333.

Steel reels replace wood

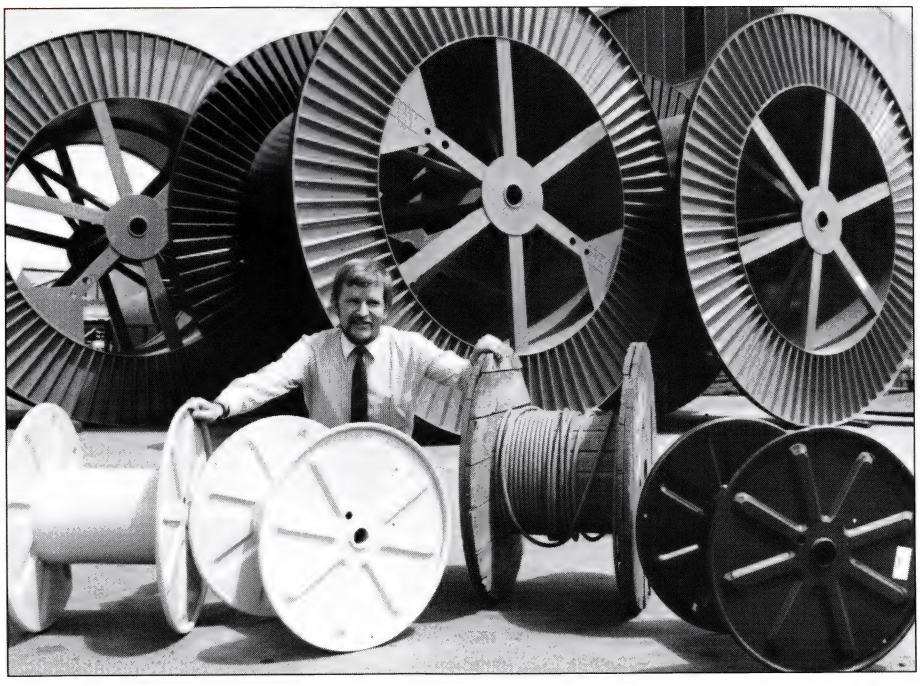
A manufacturing breakthrough in the production of cable reels used throughout Australia for wire, cable and rope storage and handling is claimed by Rheem Australia Limited.

The company has developed a low-cost method of making the reels from BHP sheet steel, a more durable alternative to timber reels traditionally used by wire and cable makers.

The new cable reels already are being exported to Singapore, India and Pakistan.

Rheem Australia Limited in Melbourne invested $120,000 over a seven-year period trialling and developing a suitable cable reel in steel to replace the timber alternative. Mr Ian Dixon, the company's manager of the engineered products said: "The advantages of steel reels over timber are appearance, strength and durability. A problem with the existing timber drums arises through prolonged outdoor storage when they can warp, splinter and be completely eaten away by termites."

Enquiries: Ian Dixon, Engineered Products, Rheem Australia Limited, 521 Geelong Road, Brooklyn 3012.



Ian Dixon of Rheem Australia with the old and the new in cable reels.

Rail bogie is 30% lighter

Trials have started on London's routes with a new type of railway bogie that promises to cut maintenance and running costs through a series of innovative design features.

The bogie was invented by the Specialist Rail Products company from Doncaster in northern England and its 15-month development also involved British Rail engineers. After the present six-month trial on London's rail system, it will be subjected to a further two and a half years testing and evaluation before being offered commercially for worldwide use.

Overall, the design is 30 per cent lighter than conventional bogies used on UK suburban routes and can be fitted to both electric and diesel units. It has fewer and more accessible parts than normal and is expected to run for one million kilometres between major overhauls.

The inventors say the reduced weight of the bogie combined with its increased payload capacity offers the prospect of major energy savings for railway operators.

Enquiries: Specialist Rail Products, Hexthorpe Trading Park, Doncaster, South Yorkshire, England DN4 OEH.
Telephone +44-302 328080
Fax +44-302 329911.

Maintenance by oil analysis

A new company in the area of planned maintenance by the use of oil analysis has commenced operations. Based in Perth, WA, Analysts Australia Pty Ltd is 25 per cent owned by Analysts Inc of Torrance, USA, world leaders in the field and 25 per cent by Sota Systems of Tokyo, a computer engineering company.

The benefits offered by the Analysts Australia's oil analysis system, are optimisation of servicing of plant and equipment.

The cost savings from service optimisation often will more than pay for the cost of the service. Another benefit is avoidance of breakdowns, because of the predictive maintenance recommendations issued with each analysis report.

Analysts Australia intends to have a laboratory in WA, to service the whole of South East Asia.

Enquiries: Peter Pomeroy, Analysts Australia, telephone (09) 388 3221.

Heavy duty paper wipe

A new heavy duty disposable paper wipe called A-Tork Mekanic from leading Swedish manufacturer Molnlycke, is now available in Australia. Supplied in 150m rolls, containing 375 perforated sheets, it is a completely natural paper product.

Manufactured from 100 per cent cellulose, A-Tork Mekanic is not only extremely absorbent, but strong enough to enable each 29cm x 40cm perforated sheet to be used several times before disposal.

The 4-ply wipe is suitable for cleaning a range of fluids, greases and oils, and for wiping down machinery and equipment.

A free trial pack is available by writing to the marketing manager, Tork Products, PO Box 727, Guildford NSW 2161.



The triple jaws of Enerpac's 100-tonne Posi Lock puller lock onto a giant gear wheel.

Posi lock pulls 100 tonnes

A new heavy duty portable puller that clamps onto work surfaces while exerting up to 100 tonnes of hydraulic drawing force has been announced by Enerpac.

The Enerpac Posi Lock three-jaw hydraulic puller, the latest and largest of a range featuring both hydraulic and manual screw actuated models, is designed for regular maintenance of large equipment and machines.

Posi Lock pullers feature a patented control cage which is designed to clamp the pullers' jaws securely onto work surfaces and lock the puller in place while its hydraulic or screw actuation draws out such components as pulleys, gears and bearing races.

The cage, which is designed to prevent pullers slipping off or snapping back, also simplifies set up, increasing productivity and tool life and eliminating dangerous situations for operators.

Features of the 100-tonne Enerpac Posi Lock include:

☐ Jaw spread from 0-1625mm (0-64in), to fit around large workpieces.

☐ Multiple hydraulic ram points and a reach of 1220mm (48in), to enhance precision positioning on workpieces. Multiple pushing adaptors are available.

☐ 100-tonne, 700 bar (10,000 psi) cylinder with spring return. Cylinder stroke exceeds 260mm (10in), and a 700-bar two-stage pump with 3m (10ft) jog switch for remote operation.

Other models are available.

"The Posi Lock range addresses very common tasks and performs them quickly and safely," Enerpac manager Roy Coulson says.

Enquiries: Roy Coulson, National Manager, Enerpac Division, Applied Power Australia, 29 O'Riordan Street, Alexandria, 2017.
Telephone (02) 698 9955,
Fax (02) 698 9664. In New Zealand, Mr Paul Udall, Enerpac Division, Applied Power New Zealand, 19 Rylock Place, Highland Park, Howick, Auckland,
Telephone (09) 576 3239,
Fax (09) 576 3239.

Wreckair Hire for rail bridge

Mackay depot of Wreckair Hire was put to use by John Holland Constructions which is building a pre-stressed concrete rail bridge across the Pioneer River, Queensland.

The bridge is one of three being built as part of a $53 million project to re-route the rail line so it bypasses Mackay's main business district.

Among the equipment which Wreckair has on site are submersible air pumps, air compressors and flex motors and shafts.

The submersible pumps were called in to lift water 30 metres during the sinking of the bridge's pylons.

The rail bridge, which is the largest pre-stressed concrete bridge being built in Australia, spans a river which, under normal flow conditions, is 400 metres wide and has a tidal rise and fall of about five metres.

Enquiries: Wreckair Holdings Ltd, 376 Sydney Road, Coburg, Victoria 3058.
Telephone: (03) 353 4111
Fax: (03) 350 4842.

Brambles forklift hire service

Brambles Equipment has more than 2500 forklifts for hire. Now available from 22 locations throughout Australia, they range from light duty, battery operated machines to 48-tonne capacity special purpose forklifts.

As owner and operator of a range of equipment, Brambles is not tied to, nor obliged to, promote any particular make or model of forklift. However, it is best-placed to provide an unbiased selection from the full range of units available.

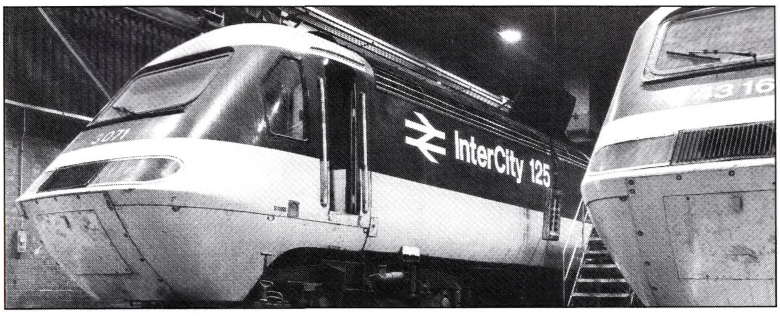
Through renting forklifts rather than buying or leasing, a business can be flexible in the number, type and capacity of the machines it may need, the company says.

Enquiries: Peter Ambrose, Forklift Product Manager, Brambles, 17th Floor, 124 Walker Street, North Sydney, NSW 2060.
Telephone: (02) 956 8799,
Fax: (02) 956 8821.

REVIEWS

High Speed Trains At Work
By Roger Ford and Brian Perren

Ian Allan Limited, UK. $35



Speed behind the tension

The Very Fast Train proposal for the Sydney-Melbourne link advanced by a private consortium is part of growing international interest in rail as a fast and efficient passenger service; however this surge of interest comes decades after the introduction of similar services elsewhere.

This book deals with events leading up to the introduction of British Rail's High Speed Train (HST) in 1976.

Not in response to a business specification and not at today's development time scales was the British Rail High Speed Train born. Forget the official record which claims that HST was a back-up to the Advanced Passenger Train (APT), part of a carefully thought out Inter-City strategy.

That is just the organisation, with hindsight, bending history to fit today's reality.

For the engineers who created HST, their train was a back-up only in the sense that they knew that APT was fatally flawed and believed that conventional technology was the right way forward for the next generation of Inter-City passenger trains.

HST was conceived at a time of tension within the British Rail engineering heirarchy.

Behind the tension was the challenge to the existing railway organisation posed by the expanding research department.

Following his appointment as Director of Research in 1962, Dr Sydney Jones had recruited a number of young engineers from outside the railway system to staff the newly-built Railway Technical Centre at Derby. Legend has it that the new men were largely from the aircraft industry; some were, but many other engineering disciplines were represented.

What the young men who came to work for Dr Jones had in common was experience of state-of-the-art engineering in a variety of industries. They came to an industry whose mechanical and electrical engineers were already struggling with the bitter fruits of an ill-considered modernisation program.

Not surprisingly they were unimpressed by what they found. And, being young and full of confidence, they did not conceal their poor opinion of railway technology from those in the existing BR engineering 'establishment'.

The staggering success of British Rail's HST revolutionised long-distance rail travel in Britain. Passengers at the time could scarcely have imagined the speeds at which they were travelling, so smooth and quiet was the ride.

In this book, Roger Ford and Brian Perren – two of Britain's most respected rail journalists – tell the story of the 'HST revolution', from the engineering work required to pave the way for 200 km/h running, through to the refurbishment program and Pullman operations.

Drawing on their extensive knowledge, the authors present a fascinating insight into seldom-appreciated 'behind-the-scenes' activities such as cleaning, maintenance, timetable planning and, of course, the astonishing feats of diagramming which have squeezed every last ounce of utilisation from the HST in recent years.

Every enthusiast dreams of riding in the cab of an HST, and in *HSTs at Work* the authors convey the excitement of an HST cab run while not forgetting to mention all those details which make the train's performance possible.

HSTs at Work presents a superb selection of photographs depicting the many facets of HST operation, and is destined to become the definitive work on these outstanding trains.

ISBN 0 7110 1784 0 from Lothian Books, 11 Munro Street, Port Melbourne 3207.

1918 TIMETABLE REPRINT NOW AVAILABLE

The Australian Railway Historical Society, NSW Division, has just released a reprint of an early Trans-Australian Railway Timetable.

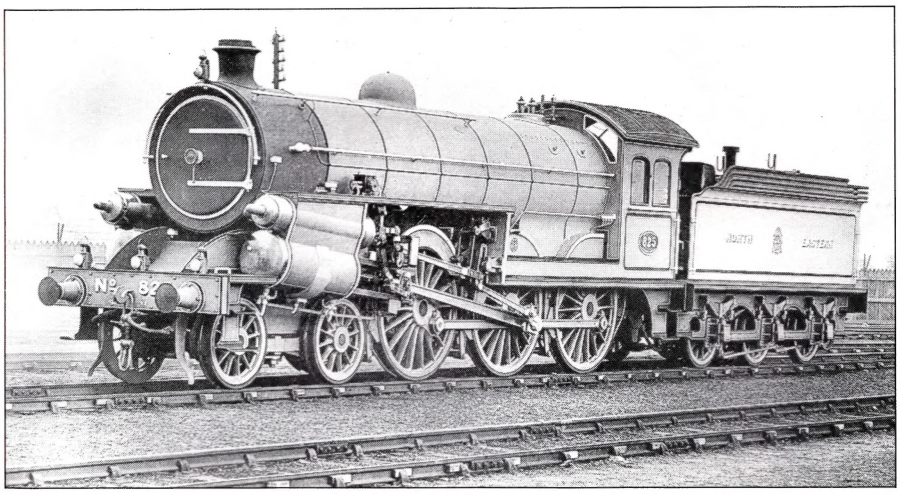
The line opened in 1917, and the original of this timetable was published just five months after services commenced.

Features of the pamphlet include some fascinating period advertising and interesting photographs. A map of the line is included, together with details of the railway and a description of the region traversed.

The standard of reproduction is very good, and the whole is an interesting historical snippet at a very affordable price.

$6.95 r.r.p. – 8 pages, large format folded. Three-colour cover, saddlestitched. The timetable bears the date 28 March 1918.

Enquiries: Australian Railway Historical Society, 182 Redfern Street, Redfern NSW 2016. Telephone (02) 699 1714.



The 'Uniflow' cylinders on the North Eastern (UK) Railways 4-6-0 No 825 seem to give the engine an aggressive appearance.

Experiments With Steam
By Charles Fryer

Patrick Stephens Limited, UK. $45

Unusual locomotive design

Throughout the history of locomotive development the quest was for greater efficiency and economy. Although a clear evolutionary pattern can be traced from the earliest days to the end of steam in the 1960s there were also numerous fascinating departures from the norm which were keenly explored by locomotive engineers.

Each seemed to promise the way forward towards the steam traction of the future, but many turned out to be no more than blind alleys.

Some of the most intriguing of the experiments are featured in this book. Each of the 20 or so examples selected by Dr Fryer involves locomotives which exhibited some unusual features which designers wished to try.

Sometimes one solitary example was built, sometimes a few, sometimes many, before discontinuing a development. Abandonment did not necessarily mean the experimental engines failed to perform satisfactorily; in fact some of them were highly successful. As the author discovered during his research however:

"Very often what one locomotive superintendent thought to be a good idea, worth multiplying, did not commend itself to his successor who either scrapped or rebuilt what he had inherited. Locomotives did to a considerable extent express the likes and dislikes of designers."

And, that is one reason why this book is so fascinating; it is as much a study of the human endeavour involved in steam locomotive experiment as it is of the introduction of refinements and innovations in the quest for better use of steam.

The technical explanations are well expressed and easy to follow. The basic technology, after all, was simple and involved merely the transfer of steam power to best effect. Much of the engineering was theoretical in its concept in the first half of our century with progressive problem-solving as the experiment went along its merry way.

One of the most unusual locomotives, by no means the most unusual though, was the Irish turf-burner. The outbreak of World War II resulted in coal shipments from Britain to Ireland being severely restricted. Ireland does not have much coal of its own, but an abundance of indigenous peat which could be dug from the bogs was widely used in domestic fireplaces.

To produce the same heat as coal, however, required double the bulk of turf and more than twice as much in weight. There were many problems initially, but eventually briquettes were made from the turf and the Irish Great Northern managed to run on this fuel. The typed memoirs of an Irish lady who travelled frequently between Cork and Dublin during 1941-44 carrying official government documents is revealing.

Before the war she could have completed the double journey in a day and had time to spare in Dublin. As things were with the turf-burner it took all day to do the 265 kilometres because so many stops had to be made to reload the engine's tender with turf.

Dr Charles Fryer sprinkles his technical text with actual reports and extracts from the writings of those who participated in the experiments with unusual locomotives thus enriching the experience in a way which involves the reader and facilitates identification with human experience devoid of technical jargon.

The book is well worth a place on the rail enthusiast's library shelf. It is intensely interesting and enjoyable reading. In the final chapter Dr Fryer poses the question — Could there be a return to steam? That, he says would be the final experiment with steam — to bring it back again.

Experiments With Steam first published 1990 (review copy from Collins Angus and Robertson, North Ryde NSW) is readily available from most major bookshops.
ISBN 1-85260-290-4.

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